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ADDRESS OF HON. MITCHEL KING.—CULTIVATION OF THE OLIVE.

A YEAR has nearly rolled round since this learned and eloquent Address was delivered before the State Agricultural Society of South Carolina, in the Hall of the House of Representatives, by Hon. MITCHEL KING, and eagerly as we read and much as we admire it, we have not had an opportunity to take of it the favorable notice deserved; neither can we now. We would fain give it entire, but there are hundreds sent, for which room cannot be found; and there is the less necessity for it as these addresses are generally preserved in pamphlet form, and distributed in the local papers and preserved in the annals of societies, before whom they are delivered. It would fill the pages of any periodical less voluminous than this, to record them all.

We have on other occasions remarked on the erroneousness of the impression, that the business and literature of Agriculture) we can hardly yet venture to employ the word Science) are less cultivated and *understood* in the *South* than in the *North or East!* A more erroneous impression could not well be entertained. Not only is there, as we believe, a greater proportionate number of well-read agriculturists in Virginia, South Carolina or Louisiana, than among the same number of landholders east; but their field-work is as well executed on *large* plantations, as in any part of the Union. But, there is not the same economy—the same attention to, and exact amonnt of the out-goings and the in-comings. The Eastern farmer has the prudence to take care of the *pence*, while the Southern planter spends his pounds. We heard a venerable octogenarian judge in Virginia last summer remark, that he had seen in the time of General Washington, (who was himself passionately fond of the chase, and somewhat addicted, as an amateur breeder and racer, to the sports of the turf;) that he had seen as many as four hundred (we think it was four hundred) private coaches on the race-course at Fredericksburg, at one time; several with four horses and *some with six*. But those times have gone by. *Tempora mutantur et nos mutamur cum illis.*

As to the formation of agricultural societies for intellectual cultivation and advancement of the great art of husbandry, many suppose that it not only originated in the North, but know not that in the South to this day any such manifestation of sensibility to its rights and interests has taken place. Whereas we see in this admirable Address, what was indeed not new to us, that

"The Agricultural Society of South Carolina began in 1784, was organized on the 24th of August, 1785, and Thomas Heyward, Jr., one of the Signers of the Declaration of Independence, and the late venerable Thomas Pinckney, were elected President and Vice-President. Gentlemen of distinction in other States, and among them Mr. Jefferson, then (in 1785,) Minister to France, were elected members. Many of the members have, from time to time, communicated the results of their experience to the publications of the day, but these communications were not then collected into any permanent work. The publications in which they appeared, have most of them passed away, and though they may have added to what may be called the traditional knowledge of the planter, they generally cannot now be found and consulted for more accurate information. The money raised among the members was liberally expended in promoting the improvement of stock, importing new objects of agricultural industry, and endeavoring to introduce a better system of husbandry and new productive staples into the country. But the results of these efforts were not so successful as they certainly deserved to be. The introduction of the tide-swamp culture of rice by Gideon Dupont, about 1783, and the extensive production of cotton as an export, nearly at the same time, were due rather to individual skill and enterprise, than to any public encouragement. But the spirit of inquiry and improvement increased. The establishment of the South Carolina College sustained and fostered this spirit. The light of learning and science, which has shone and shines there with so much lustre, has cheered and illumined—may it ever continue to cheer and illume—every corner of our land. The labors of a Free Press, and the diffusion of periodical literature, have carried information to every fireside. Agricultural Societies have been formed in different parts of the State, and this Society, combining them all in united and continued effort, has, we trust, commenced a career of usefulness that will lead to the most favorable results. The valuable addresses which have been delivered before you, the reports made to you, and the memoirs collected by you and published for general use, and placed within the reach of every planter, will be of lasting benefit. And the State, by the persevering, untiring efforts of gentlemen of this Society, has been induced to direct the Geological and Agricultural Survey, which, in the able hands by which it has been conducted, has already afforded much invaluable information, and, it is earnestly hoped, will be continued until all the objects contemplated by it be fully attained."

The following suggestions are of general interest, and well worthy the attention of all agricultural associations:

New modes of cultivation, of draining, of manuring, are constantly presenting themselves. New agents of fertility are discovered and applied, not only among ourselves, but in different parts of the world. It would be expensive and hazardous for the individual to test by experiments the success of these novelties, and to ascertain how far they may be adapted to our soil and climate. When such matters are brought under the notice of our Society, how easy and how important would it be to appoint special committees of our body to examine each particular subject of inquiry—to experiment upon it, if experiment be necessary, and to report the results to the next meeting of the Society. The expense and attention and skill of one member would thus inure to the benefit of all, not only of the Society, but of the State. The time and talents of each Committee being particularly called to the subject submitted to it, would secure greater care, and stimulate to more accurate observation and fuller details than can be ordinarily expected from solitary and unsolicited inquiry. We have recently had the highest evidence of the accuracy and importance of the information of a new process of manuring, from the skill and experience of a distinguished member of the Society, who has given to a kindred association the results of his intelligent and continued experiments in marling—and has put that information in the most appropriate shape to be communicated to every planter, and preserved for our successors."

Let those who dare stigmatize the most valued and important of all pursuits, and impeach the wisdom of the Creator himself, by insinuating that there is no connection between the cultivation of the earth and the cultivation of the mind; deny, if they can, the truthfulness of what follows:

"Matters of inquiry on subjects connected with Agriculture are absolutely as boundless as the physical history of the earth which we inhabit. Every year is making new discoveries in the diversities of soil—of the elements of which it is composed—of the quantity of the different parts which enter into the composition—of the growth of plants—of what they owe to the air or to the elements of which it is formed—to the light or to its elements—to electricity, and all the agencies in vegetation by which, in the wonderful laboratory of Nature, the grain produces fruit after its kind, and the small seed becomes a great tree."

Or the expediency of the following recommendation. How much more would it be in keeping with the spirit of the age, if societies would promote such research-

es in Natural Chemistry, instead of going on eternally awarding their premiums to things already known.

"There are some departments in Natural History which are too apt to be looked upon with indifference, even by the considerate, and treated with ridicule by the would-be wit, that are yet of the utmost importance to the husbandman. Our cotton fields are exposed to many enemies—at one time a small caterpillar, that in summer changes into a pretty moth—at another time a large kind of caterpillar, called the army-worm, which produces a butterfly—at another time an insect called the cut-worm or the cotton-louse, attack the cotton plant and blast the hopes of the planter. The Hessian fly lays waste the wheat-field; the locust that has been buried in the ground, as it is said for years, issues from its larva, a winged plague, and spreads devastation and ruin in its track. These, and insects like these, are undoubtedly governed in their production and ravages and whole being, by laws which are little understood. If we knew these laws, we might be able effectually to check or even to destroy their production—and thence either greatly lessen or entirely prevent their ravages. The accumulation of facts respecting these several destroyers, brought together and reported at our anniversaries, would furnish materials from which Science might ascertain these laws. It will be for the Society to determine how far they will direct attention to the collection of such facts."

But our purpose now is to detach from Mr. King's Address the following letter, with which it was enriched, from the classical pen of a practical agriculturist, of whom the profession may be proud—J. HAMILTON COUPER.

NEAR DARIEN, Sept. 3, 1846.

My Dear Sir: I beg you to be assured that, in complying with your request to furnish you with any facts within my knowledge and my views generally, on the subject of the cultivation of the olive tree in this country, I feel equal pleasure in promoting a patriotic object, and in being able, in however trifling a degree, to gratify your personal wishes.

Having had my attention called, many years ago, to this subject, by an experiment on a somewhat large scale, which my father made in 1825; and having devoted some attention to the works of European writers on the cultivation of the Olive, and the manufacture of oil from it, I hope that the following extracts from my note-book may save you some trouble in your investigations. I have probably given much that is already familiar to you; but if I have, you must blame yourself for professing that the subject is comparatively new to you.

The first and all-important question which presents itself is, whether our climate is adapted to the olive tree: and to what portion of our territory we may hope to extend its cultivation. The facts which will be presented, are, I think, decisive, that the immediate seaboard of South Carolina and Georgia, the whole of Florida, and the borders of the Gulf of Mexico, are as suitable for the cultivation of the olive as the south of France.

First, as to climate—Arthur Young, in his travels through France, vol. i., page 311, observes, "several other plants, besides the olive, mark this climate, (the olive climate). Thus, at Mentelimart, in Dauphiné, besides that tree, you meet with, for the *first time*, the *pomegranate*, the Arbor Judæ, the paliurus, *figs*, and the *evergreen oak*."

The orange tree is found to be more tender than the olive, in France and Italy. The same writer says, "the latter plant (the orange), is so tender, that this (Hieres) is supposed to be the only part of France, in which it will thrive in the open air. I went to Hieres to view them, and it was with pain I found them, without exception, so damaged by the frost, in the winter of 1788, as to be cut down, some to the ground, and others to the main stem."

Rosier, in his Cours d' Agriculture, t. 7, p. 253, observes, "Dans le village d' Hierès on est mème obligé de couvrir les citrouniers, les cedrats, etc., pendant les rigueurs du froid."*

Mr. Jefferson in his letter of July, 1787, to the Agricultural Society of South Carolina, remarks, "Wherever *the orange will stand at all, experience shows that the olive will stand well*, being a hardier tree."

Simonde mentions, in his work on Tuscan Agriculture, (Tableau de l' Agriculture Toscane, p. 112), that the olive is considered in Italy as hardier than the vine. "L'on a souvent mis en question si l' on ne pourrait pas naturaliser l' olivier dans des climats moins chauds que ceux qui lui servent de limites, et l'on etait encouragé dans cette espérance par l' observation qu'en Italie quoique l' olivier souffre d'un grand froid, il est, cependant *considéré comme plus robuste que la vigne*, et qu'en conséquence on le place à des expositions òu celle-ci ne pourrait pas crôitre."† He farther observes that he himself had vines and olives planted together, and that the for-

[* *Translation.*—In the village of Hierès people are compelled to cover the lemon trees, citrons, &c., during the rigors of the cold. *Ed. Farm. Lib.*]

[† *Translation.*—The question has often been raised whether the olive could not be naturalized in climates less warm than those to which it is now limited; and the hope that it might be done has been strengthened by the fact that in Italy the olive, though it suffers a great degree of cold, is *considered more robust than the vine*, and in consequence is placed in exposures where the latter could not grow. *Ed. Farm. Lib.*]

mer suffered most from the cold. This writer also says that the sweet orange does not succeed well in Tuscany, unless it is protected. "Quoique l' orange doux de Portugal croisse quelquefois en plein vent, dans des jardins bien défendus de la bise, cependant il ne réussit bein qu'en espalier, et autant qu'on peut le préserver des grands froids avec des paillassons."* Id. p. 204.

Bosc, in the article Olivier, Nouveau Cours complet d'Agriculture, t. 9, says that the frost acts injuriously at two periods of the year in France: the first, during mid-winter, whenever the thermometer descends lower than ten degrees below zero, (14° of Fahrenheit), then not only the branches but even the trunks perish, and they have to be cut down. This was the case in 1709, and in 1788, when most of the olive trees in France were destroyed to the ground, (see Young's Travels, vol. i. p. 311). The second period is during the spring, when the plant is in vegetation.—This only occasions the loss of one or two crops, by nipping the extreme shoots: but as injury is more frequent from this cause than the former, the effect is nearly the same.—Bosc, who lived sometime in Charleston, attributes the neglect of the cultivation of the olive in Carolina, to this latter cause. "C'est cette cause, ainsi que je m'en suis assuré sur les lieux qui a empêché les plantations d'oliviers tentés en Caroline, aux environs de Charleston, *climat plus chaud qú aucun canton de France, de reussir.*†

These extracts, which are from writers of the highest authority, are interesting, as they show from the growth of the fig, the promegranate, and the orange, that the climate of the olive region of France is no milder than the maritime districts of South Carolina and Georgia, and the whole of Florida. But the actual growth of the olive tree itself proves this most conclusively, as far as the limited period which has elapsed since the introduction of that plant into this country, admits of a comparison.

I believe that you had some olive trees growing in Charleston for half a century before the fatal spring of 1835. Ramsey mentions the fruit being pickled from trees imported by Henry Laurens.

At Dungeness, on Cumberland Island, Ga., a number of trees bore abundantly for many years before that season.

In 1825, my father imported through a French house in Charleston, two hundred trees from Provence, via the Languedoc Canal and Bordeaux. They were five months on the way, and did not arrive until May: notwithstanding which, a very few only failed to grow. These trees were planted at Cannon's Point, his residence on St. Simon's Island, latitude 31° 20′; and had borne several small crops of olive, when the severe cold of February, 1835, (8° of Fahrenheit), injured them so much that it was necessary to cut them down to the ground. They all threw up shoots from the old stumps; and many of them had now attained to a diameter of nine inches. For the last two years they have produced some fruit; and this year about one-half of the trees are bending under the weight of an abundant crop. About one hundred trees raised from cuttings are also beginning to bear. Is is now twenty-one years since the importation of these trees, and with the exception of the destructive season of 1835, they have never, in the slightest degree, been injured by the cold. The last winter was one of unusual severity—the thermometer having sunk to 19° Fahrenheit; and although the sweet oranges on the same plantation were much injured, some having been cut down to the ground, I could not perceive that a single leaf, among two hundred and fifty olive trees, had been touched by the frost. This experience is certainly very satisfactory, the more particularly as it is certain that the season of 1835 was the coldest known on this coast for at least one hundred years; as is proved by the destruction of orange trees on St. Simon's Island, which had stood since the occupation of that island by General Oglethorpe, and of others of St. Augustine, which dated still farther back.

The effect of one such disastrous year should not discourage the introduction of so valuable a tree. In the South of France they have persevered in its cultivation, although in 1709 and 1788 almost every tree was destroyed to the ground; and they were severely injured in 1740, 1745, 1748, 1755, and 1763.—(Nouveau Cours d Agriculture, t. 9, p. 194.)

With respect to the danger from the frosts of the spring, alluded to by Bosc, it may be observed that very fortunately the olive tree is late in putting out its flowers, and that they rarely appear before the end of April, by which time there is little risk from frosts on this cost. The failure of the crop for one or two years would be the only injury.

It may be doubted whether the olive tree can be cultivated beyond the influence of the sea air, on the coast of Carolina and Georgia, with the varieties at present known. But it may be hoped that this plant will, in time, become acclimated; and that, by pursuing the plan of raising from the seed, which has been found to produce hardier plants, new kinds, adapted to a greater range of climate, may in time be introduced. The gradual extension of the olive, from the southern to the northern shores of the Mediterranean, would encourage this expectation. The southern coasts of Italy and Spain, which are now the great oil markets of the world, were, during the early periods of Roman history, destitute

[* *Translation.*—Though the sweet orange of Portugal sometimes grows in the open ground in gardens where the north wind is kept out, still it succeeds only on espaliers and when it is protected by mats from the extreme cold. *Ed. Farm Lib.*]

[† *Translation.*—It is this cause, as I am convinced, which has prevented the success of the olive plantation attempted in Carolina in the vicinity of Charleston, *a warmer climate than that of any canton of France.* *Ed. Farm. Lib.*]

of the olive. "Sous le règne de Tarquin l'ancien, cet arbre n'existoit point encore en Italie, en Espagne, et en Afrique. Sous le consulat d'Appius Claudius l'huile étoit encore trés rare à Rome; mais du temps de Pline l'olivier déja passé en France et en Espagne,"* *Humboldt, Essai sur le Géographie des Plantes*, t. 4, 1807, p. 26.

The suitableness of the soil of our southern coast to the olive tree admits of no doubt. It thrives in every soil which is not wet. "Toute espèce de terre, pourvu qu'elle ne soit pas marécageuse, conviént à l'olivier, cependant comme il donne souvent plus de bois que de fruits dans les terrains fertiles, et que ces terrains sont toujours précieux pour la culture du blé, etc., on le plante plus genéralement dans des lieux caillouteux, *sablonneux*, sur les coteaux les plus arides, pourvu qú ils soient exposés au midi ou levant."† (Nouveaux Cours d'Agriculture, t. 9, p. 174).—That the sandy lands of our seaboard are adapted to the olive, needs no other proof than the luxuriant growth of the trees on St. Simon's and Cumberland Islands.

Should the olive become acclimated to the interior of the States of South Carolina and Georgia, it will find, in the open and gravelly soil of the tertiary slope, between the granite ridge and the tide-water, its most congenial soil. "Aptissimum genus terræ est oleis cui glarea subest, si superposita creta sabulo admista est."‡ (Columella de re rustica, lib. 5. cap. 7. Aldus Venetiis, 1514.) And in his Liber de Arboribus, cap. 17, he says, "Olea maxime collibus siccis, et argillosis gaudet, at humidis campis, et pinguibus, lætas frondes sine fructu affert." ‖ §

Admitting the suitableness of the climate and soil of the sea-coast of Georgia and South Carolina, and that portion of the territory of the United States which lies south of latitude 31°, to the cultivation of the olive, the question next presents itself, is the introduction of that tree likely to prove such a source of profit to the agriculturist as to be worthy of his attention? A calm examination of this part of the subject, will probably disappoint those whose standard of profit has been the exaggerated *hopes* of the cotton culture, and who tolerate no delay in reaping the reward of their labor; but it may present a sufficient inducement to devote some time and expense to the subject, to a class of persons less impatient of growing rich, and who believe that the direction of a part of the agricultural labor of the Southern States to new objects, is called for by the excessive production of a few staples, and that the introduction of a plant affording a wholesome and nutritious article of food, and which is important to many valuable manufactures, will add very materially to the wealth, happiness and independence of the country.

The distance at which the olive trees are planted, is regulated by the circumstance whether the ground is to be devoted solely to them, or is to be cultivated at the same time in grain. In the first case they are placed nearer, and in the latter farther apart.

Bosc, in the article quoted above, observes that generally where the soil is fit for cultivation, the trees are placed far apart, in order to grow some other crop in the interval between them; and says that this practice should be approved of, both because the olive being subject to fail in its fruit, the whole revenue from the land is not lost, and because it is benefited by the annual cultivation which the other crops require, and because the greater the distance between the trees the greater their size, and the more abundant and the better the fruit. He adds that the average distance of the trees apart should in rich soils be fixed at 48 feet, and in poor at 36.

Arthur Young mentions that in Languedoc "many fields are planted in rows at 12 yards by 10." (Travels, vol. ii., p. 72.) At Pingean, "In planting, if they mean to crop the land with corn, in the common manner, that is, one year in two, the other fallow, they put 100 trees to 8 seterées of land; but if they intend to have no corn at all, the same number on 4 seterées. (Id. p. 73.) As the seterée is equal to half an acre, this is at the rate of 25 trees to the acre in the former, and 50 in the latter case.

The distance varies much in other localities, but it may be assumed as a safe ground of calculation, that 25 trees may be planted to the acre when the land is cropped, and 50 if devoted exclusively to the olive.

The product of oil varies very much with the size of the trees, the character of the soil, and the fruitfulness of the season.

In France, Young informs us that at *Toulon* "they have great trees, that are known to yield 20 livres to 30 livres a tree (40 lbs. to 60 lbs., or from 5½ to 8¼ gallons of oil) when they give a crop, which is once in two years, and sometimes once in three—small trees yield 3 livres (6 lbs.), 5 livres (10 lbs.)

[* *Translation.*—Under the reign of Tarquin the Elder this tree did not exist in Italy, in Spain, or in Africa. Under the Consulate of Appius Claudius, the oil was still very rare at Rome; but at the time of Pliny, the olive had already passed into France and Spain. *Ed. Farm. Lib.*]

[† *Translation.*—Every species of soil, provided that it is not marshy, is suitable for the olive; but yet, as in fertile land it is often rather productive of wood, and as such land is always precious for the culture of grain, etc., it is more generally planted in stony and sandy places, and on the most arid hills, if only they are exposed to the south or east. *Ed. Farm. Lib.*]

[‡ *Translation.*—That sort of land is best suited to olives which has a gravelly subsoil if there is a mixture of sand in the upper layer of loam. *Ed. Farm. Lib.*]

[‖ *Translation.*—The olive best likes dry and sandy hills; in moist and rich plains it produces abundant foliage without fruit.§ *Ed. Farm. Lib.*]

§ "Sed neque depressa loca, neque ardua, magisque modicos clivos amot."¶—*Id. Re Rustica.*

¶ "Nor hights, nor vales, but gentle hillocks loves."

and 6 livres (12 lbs.) each." In *Languedoc* "olives pay in general 3 livres (6 lbs.) each tree per annum; some 5 livres (10 lbs.)" At *Pingean* "some large and fine trees are known to give 84 lbs. of oil (or 11½ gallons of oil, as the gallon weighs 7½ lbs.); but they reckon in common, that *good* trees give 6 livres (12 lbs.) one with another." In the article *Olive*, in Michaux's North American Sylva, vol. ii., page 196, Mr. Hillhouse says, "the mean produce of a tree may be assumed in France, at 10 lbs. (1⅓ galls.), and in Italy at 15 lbs. (2 galls.); but single trees have been known, in the productive season, to yield 300 lbs. (41 galls.)"

Young states the produce of a field of 200 trees in Tuscany, to have been,

In 1786,	30 *barrels*,	(150 lbs. each,) or	615 galls. of oil.
1787,	3 ..	.. ..	61 ..
1788,	8 ..	.. ..	164 ..
1789,	25 ..	.. ..	512 ..
	66 *barrels*,	..	1352 gallons,

or an average per annum of 338 gallons, being 1⅔ gallons per tree. (Travels, vol. ii., page 235.)

"On a very bad stony soil, though in the plain, I found it took twenty trees of 25 years' growth, to yield a *barrel* of oil (20½ gallons.) But in a fine soil, and with very old trees, a *barrel* a tree has been known."

From these statements, assuming that the district to which I have conjecturally limited the olive culture, has a climate as favorable for it as that of the South of France, we may place the product of a tree in full bearing, as giving a mean annual yield of one gallon of oil, or 25 *galls. to the acre*, when the land is cultivated at the same time in some other crop; or at 50 *gallons*, if exclusively devoted to the olive. Estimating the oil at the moderate price of 75 cents per gallon, and the value will be, in the former case, $18¾ per acre, and in the latter, $37½. But to the first must be added the value of the corn or other crops cultivated on the same land; and which may be put down at nearly a full crop every second year, as the trees are reckoned in Italy to diminish the grain crop only one-fifth.

It is presumed that the best mode of promoting the general introduction of the olive into this country will be to recommend the mixed cultivation. As the olive only begins to bear about the *tenth* year, and does not arrive at its full production before the 20th to the 30th, few persons would consent to expend so much labor before reaping any return.

But under the mixed system, nearly the full amount of the usual crops is made, and the manuring and cultivating of the grain crops will be sufficient for the olive trees, and the labor of planting the young trees is almost the only extra work they will require until they commence bearing. The only objection which is likely to present itself at present is the necessity of excluding all stock from the fields; but whenever our Agriculture shall become more enlightened, this will be generally done.

The question may be asked by those who have usually regarded olive oil as merely an article of household economy, of very limited use in North America, whether a ready sale of the oil can be depended on? They may believe with the late Abbé Correa, that our countrymen have "bacon stomachs," and that it will be very difficult so far to conquer the obstinacy of established habit as to induce them to substitute pure oil for rancid bacon. If the only use of this oil were for food, it would undoubtedly require time to introduce it into general consumption; but that time will effect it, there can be no doubt, from the intrinsic value of the article. Until then an ample demand for all that can be produced will be found in the annually increasing consumption of this oil in machinery, and in various manufactures, particularly of wool and soap.* Already we import 82,655 gallons, (see Report of the Secretary of the Treasury for 1845,) and as our manufactures are comparatively, as yet, but in their infancy, and our population increasing with undiminished rapidity, there is no danger of the production overtaking the demand. What the demand may become, is shown by the facts that England imported in the year 1830, 2,791,057 gallons of olive oil, valued then at about $2,500,000—an average of 88 cents per gallon (McCulloch's Commercial Dictionary, article *Olive Oil)*; and that France, although the production of that Kingdom was, as early as 1788, estimated at 75,000,000 of francs, or nearly $15,000,000,† (Peuchet Statistique Elémentaire de la France, p. 327,) has yet imported in one year olive oil to the value of nearly 30,000,000 francs, or $6,000,000.

Some idea may be formed of the value of the olive tree as a source of national wealth, from the above statement of its production in France, a country on the northern verge of the olive climate. In countries more favorably situated, it is still more important. The small Kingdom of Naples exports annually about 7,300,000 gallons of olive oil, valued there at $3,400,000. (McCulloch's Commercial Dictionary, article *Naples.)*

But as olive oil enters largely into domestic consumption, particularly among the lower classes, forming a wholesome and nutritious article of food, it has an importance far exceeding its merely commercial value. The ample home production of the necessaries of life is the true foundation of national independence and happiness; and whatever adds to the unstinted enjoyment of physical comfort, it becomes the well wisher of his country to cherish more sedulously than those ar-

* Hereafter, perhaps, when the whale fishery shall be exhausted, for lights.

† Chaptal estimates the quantity of land cultivated in the Olive in France at 43,000 hectanes, or about 106,000 acres, which gives an annual income per acre of nearly $14. (De l'Industrie Française, t. i., p. 207.)

ticles which have a merely money value. It may safely be asserted that the United States owe their great happiness and prosperity more to the cheap abundance of Indian corn, and the consequent full supply of animal food, than to all the staples which figure so largely on the list of foreign exports.

Mr. Jefferson, with equal beauty and patriotism, observes, "If the memory of those persons is held in great respect in South Carolina, who introduced there the culture of rice, *a plant which sows life and death with almost equal hand*,* what obligations would be due to him who should introduce the olive tree, and set the example of its culture! Were the owners of slaves to view it only as a means of bettering their condition, how much would he better that by planting one of these trees for every slave he possessed! Having been myself an eye-witness to the blessings which this tree sheds on the poor, I never had my wishes so kindled for the introduction of any article of new culture into our own country." (Letter to the Agricultural Society, So. Ca.)

If the facts given above are sufficient to prove the importance and practicability of cultivating the olive among us, no impediment is presented by the difficulty of propagating it, as it is readily increased by seed, by cuttings, suckers, portions of the root, or by grafting. The mode of raising by the seed is only resorted to in order to produce new varieties, or as stocks for grafting, as the fruit from seedlings, although yielding an oil of a more delicate and higher flavor, is usually very small. Grafting improves the quality of the fruit, but is not so generally resorted to as propagation by suckers and cuttings. The last is the most practiced. Limbs from an inch to an inch and a half in diameter, are cut into lengths of from 12 to 15 inches. Trenches 5 feet apart and 6 to 8 inches deep being prepared, the cuttings are placed in them, about 18 inches apart, and in an oblique position, so that when the earth is filled in, from one to two inches will remain above the ground. On the exposed end a little gardener's cement should be smeared, to exclude the water; and over the whole some moss or loose sand is drawn, for some time, to diminish the evaporation. In dry weather the cuttings should occasionally be watered, until they have taken root. Until the third year nothing more is required than to cultivate among the young plants, and to trim them to a single stem. When three years old, the young trees should be planted out in the usual way, at distances of from 30 to 48 feet. The holes should be made large and deep, and had better be dug several months before the trees are put out. The subsequent cultivation consists in removing the suckers, trimming out the dead wood, in manuring moderately once in 3 or 4 years, digging around the roots annually, and in plowing once a year the intervals, unless a crop of grain is cultivated among them. Much difference of opinion exists in France on the subject of pruning; but unless it is deemed desirable to keep the trees low for the facility of gathering the fruit, or to diminish the risk of their being blown down by high winds, all that appears to be necessary is to remove the decayed wood, and to keep the head of the tree moderately open, for the free admission of light and heat.* With us the liability to severe gales of wind will recommend low trimming; and the same evil will probably lead to the practice of grafting on seedling stocks, the tap-root of which will insure the stability of the future tree. From cuttings, in thin soils, the roots will be too superficial for safety.

The manufacture of this oil is extremely simple; and requires no very complicated or expensive machinery. The latter consists of a mortar, a revolving stone, or some other contrivance for separating the pulp from the stones, and of rendering it a paste; a revolving stone, like a bark or cider mill for crushing the stones; a lever or screw press for the pressing of the oil from the pulp and stones; bags of coarse cloth or hair to contain the pulp; and wooden or earthen-ware vessels for receiving the oil from the presses, and for separating it from the mucilage.

As soon as the olives are ripe, which is indicated by their becoming of a dark color and soft,† they are gathered by hand, and spread out over floors to the depth of a few inches. In this situation they remain three days, being turned daily, and the decayed berries carefully picked out. They are then placed in the mortar or under a stone, and moderately triturated, until the pulp is reduced to a paste, and is detached from the stones. The stones having been removed, the pulp is then put into coarse and strong bags, and placed under the press, which should be worked very slowly at first. From the press the oil mixed with mucilage runs into wooden vessels, half filled with water. After standing from 12 to 24 hours, to give time for the mucilage to separate from the oil, the latter is decanted into other vessels, and remains undisturbed for about 20 days. It is then ready to be decanted again and finally put into the barrels in which it is to remain. During this repose, nearly all the mucilage will have been precipitated; but the oil is still liable to be *troubled* until it has been exposed to the cold.

The oil from this expression is of the first quality. The pulp or *cake* remaining in the bags from this first pressure, is then broken up, moistened with warm water, returned to

* The italicising is my own. One who has cultivated rice for 25 years, must feel the force and emphasis of this beautiful figure.

* Virgil appears to have been no advocate of the pruning-hook:

"*Contra, non ulla est oleis cultura; neque illæ*
Procurvam expectant falcem——"
[Georgica, lib. ii. v. 420.

† On St. Simons the season of maturity is October.

the bags, and again pressed. The oil from it is nearly equal to the first, and may be mixed with it.

The stones having been reduced to a paste by grinding under stones, are pressed in the same way, and yield an inferior oil, of a harsh taste, and running rapidly into a state of rancidity.

The quantity of oil which may be extracted from a given weight of the fruit is stated by M. Sieuve (Nouveau Cours d'Agriculture, article *Huile*) as follows: 100 lbs. of sound olives gave 76½ lbs. of pulp, and 22 lbs. stones. The 76½ lbs. of pulp, when pressed, yielded 21¼ lbs. of limpid oil of the first quality. The stones, having been ground, gave 6 lbs. 14 oz. of kernel, and 14 lbs. 4 oz. of woody fibre. The kernel and woody fibre gave 5¾ lbs. of inferior oil. Together making 27 lbs. of oil from 100 lbs. of olives.

The refuse of the manufacture forms a valuable manure.

The above is a mere outline of the mode of cultivating the olive, and of extracting the oil. To enter fully into the subject would occupy many sheets of paper; and such detailed information is probably foreign to your purpose, which, it is presumed, is to recommend it to the attention of the South by presenting for consideration its most important features, and to go no farther into minutiæ than may be necessary to an accurate knowledge and correct appreciation of it.

If, however, I am mistaken as to your views, it will give me pleasure to furnish you, hereafter, any farther details.

To those seeking the fullest and most practical information on this subject, I would recommend the perusal of the articles *Olivier, Huiles and Moulins* in the Nouveau Cours d'Agriculture, vol. xiii., No. 8, Paris, 1809. They form a most excellent treatise, and are from the pen of Bosc, to whom I was introduced at Paris, as one of the most able and distinguished of their agricultural writers. Bosc has taken the articles of the celebrated Abbé Rozier as his basis, but has retrenched from them much that was useless, and added much that is valuable. Should your State Society be disposed to patronize the olive—and I trust that your Address will so incline them—a translation of these Essays, accompanied by two or three plates, which would form a pamphlet of some 50 pages, will place the public in possession of the best attainable information—information not now existing in an English dress, as far as I am aware.

The experiment made by my father—who, although 88 years no longer allow of his taking an active part in field operations, is still deeply interested in the subject—has proved so satisfactory that it is my intention to prosecute it on a larger scale. We have succeeded perfectly in pickling the olive, and in making from it the finest oil I have ever tasted. This season I expect to make several hundred bottles of oil; and if I am not disappointed by a hurricane, I hope this winter to submit a sample for your critical judgment. Having now about 250 trees of various ages, and intending to increase them, I hope in a few years to be able to test conclusively the question of the olive culture in Georgia. The experiment will not be a costly one, as the ground occupied by olives is cultivated at the same time in other crops.

The following quotation from Columella, with which I will close this very long communication, (in which I have without mercy emptied out upon you my note-book,) is consolatory to the experimenter, and will, I am sure, recommend "the first of all trees" to that large class of persons who, although having their full share of a desire for good things, are equally adverse to labor and to risk:

"Longeque ex omnibus stirpibus *minorem impensam desiderat olea*, quæ prima omnium arborum est, nam quamvis non continuis annis sed fere altero quoque fructum afferat' eximia tamen ejus ratio est, *quod levi cultu sustinetur, et cum se non induit, vix ullam impensam poscit.* Sed et siquam recipit, subinde fructus multiplicat. Neglecta compluribus annis non ut vinea deficit, eoque ipso tempore aliquid etiam interim patrifamilias præstat, et cum adhibita cultura est, uno anno emendatur. *Quare etiam nos in hoc genere arboris diligenter præcipere censuimus.*"* (Col. de re rustica, lib. v. cap. 7.

Requesting that you will at all times command me whenever I can be useful to you, I am with great respect and esteem, my dear Sir, your obedient servant,

J. HAMILTON COUPER.

M. KING, Esq.

STATISTICAL.—There are employed in the commerce of the Mississippi Valley 12,000 steamboats, the cost of which does not vary far from $16,000,000. On them are employed more than 40,000 men, women and boys. The annual expense of running the boats is about twice their cost, say 32,000,000. To this may be added about 4,000 flat and keel boats, employing 20,000 men at least. The value of the annual commerce of the Mississippi Valley is estimated at $430,000,000. The capital invested in vessels of all kinds on the great Northern Lakes is about $6,000,000, or one-third of that invested in boats on the western rivers.

[* *Translation.*—The olive, though the first of all trees, *requires much less care* than any other, for though it does not bear every year, but more generally every other, it has this excellent peculiarity, that *it may be kept in good order with very little culture*, and when *it is not bearing, causes hardly any expense*, though if it is then generously cared for, its yield will afterward be greatly increased. And even if it is neglected for many years, it does not die out like the vine, but even then produces something for its owner, and with proper treatment may be fully recovered in a single year. *For these reasons it is my opinion that we cannot bestow too much attention on its culture.* *Ed. Farm. Lib.*]

BOUGHT, OR ARTIFICIAL AND FARM-YARD MANURES.

It is a curious fact, and much to their credit and enterprise, that in a certain neighborhood of Montgomery Country, Maryland, there is probably a greater amount of artificial manures—or rather mineral and animal manures—*purchased* and carried on to their farms, than in any other district; entitling them to the more credit when it is considered that they are without the advantages of water or artificial conveyances to transport it.

At the same time they well understand the importance of home-made manure, and have too much good sense to consider the one as incompatible with the obligation to husband the other. On the contrary, they chime in with each other when we consider that farm-yard dung does not give back to the land all that the crops out of which it is made take from it; and hence the necessity, when it can be done, to bring on other manures to make up for that which the crops take away from, and which farm-yard manure does not supply. Therein lies the *rationale* of the case as relates to the two kinds of manure.

On this point the following observations are clear and worthy of attention, although the substance of them may have been again and again presented to the reader. There is more information—more wholesome food for reflection in remarks like these, by Professor Lindley; and by the reflecting farmer they will be turned to more account, than is or can be made, upon one-half of what is *seen* at a Cattle Show. Everything goes to show the necessity for *instruction in the principles of the art!* Without a knowledge of Agricultural Chemistry, who can, or how are we, to know the true value of either farm-yard or bought manures? A large proportion of the former is doubtless often *mere rubbish*, not worth—as the farmer would see if he could analyze it—the cost of hauling it out upon his land.

Farm-yard manure, for instance, made through the winter in an open pen, exposed to wind and weather, and composed of the offal of half dead and alive cattle, fed exclusively on wheat-straw! How much more can it be worth than the straw itself, since the cattle are merely used as machines to grind it down and condense it? The virtue of such manure, supposing the whole straw to be thus punctually restored to the land, falls lamentably short of balancing the account, when we consider what the grain has taken off. The case is very different when the grass or grain crops are consumed on the land. If home-made manure is thus liable to be of little or no value, so may be others; such as marl, guano, lime, bone-dust, &c., for they may be either poor or spurious, and the analyst only can tell. When the sciences connected with Agriculture come to be taught in our schools, though every man may not be his own chemist, we shall have such chemists abounding in the country, just as we had, on the bringing on of the War, West Point Government educated officers to drill and train the militia—and why should not the agricultural chemist be provided by the Government, or out of the Public Treasure, as well as the man of *science in the art of war?* Just because farmers are *not* educated as they should be in a knowledge of their own rights, and in a sense of self-respect, which, if they possessed, Members of Congress would not dare misrepresent them and their interests as they do on this point.

The late Mr. Wellford, an estimable and enterprising farmer of Fredericksburg, not only gave his straw to the livery stables of that place, but hauled it to them. But he sagaciously bargained for all their manure in return, whereby he not only got back his straw in the most available shape for use as a fertilizer, but it had vastly increased in value, by the addition of all the oats consumed along with it. He had the good sense to know, what every one should, and should be governed by, that the richness and value of animal manures depend upon the nature and quality of the food. We much doubt whether straw itself, and by itself, would not be more valuable if thinly spread over the grain in winter, on the Gurney plan, than it is as manure, on merely being passed, unmixed, through the bodies of domestic animals.

Remarks by Professor Lindley.

"Supposing the soil to be now in a condition of satisfactory fertility; that fertility must suffer during the growth of a crop, for the mineral portion of that crop, and some of its organic substance also, have been supplied by the soil; plow that crop under, and so far indeed, as the latter portion is concerned, you do more than restore what has been taken, for the atmosphere contributed largely to the organic part of the plant; and all that, by this operation, is made a clear addition to the substance of the soil; but so far as the inorganic portion of the crop is concerned, by plowing it in you do but restore that which you have taken. In point of fact, however, the crop is rarely, and, taking a whole farm together, never thus returned to the land—the greater part of it is generally *sold off the farm never to return*, or the whole of it is consumed by live-stock, and only part of it is restored to the soil.—Farm-yard manure—the straw of the grain crops, together with the excrements of the stock—is thus the whole produce of the land *minus* that which has been sold. We suppose that nothing has been wasted, and we are right in saying that what the farmer ordinarily adds to the land is not all that he has taken from it: the difference—lost to the soil—has been sent off the farm in the *inorganic portions of the grain*, and in the *bones* of the stock which he has sold. How shall this deficiency be made up? the *lost substance must be imported somehow, or the soil must suffer.**

Some farmers import food for stock—oil-cake, linseed, beans, barley, &c.; others purchase *artificial manures*. Both act on similar principles—they aim at supplementing the deficiencies of their own more natural supplies.

These remarks, then, illustrate the nature of the respective offices of farm-yard and artificial manures. Consider them in relation to the question of maintaining the fertility of the soil, and the latter holds the subordinate office of merely supplementing the deficiencies of the former—consider them in reference to the growth of a crop, and their relative value depends simply upon their composition—the former is often rubbish, while the latter, if genuine, may be of the highest value—the former, if well manufactured, is all-important, while the latter may be a mere vehicle for roguery. We say that, considered as the food of the plants, the relative importance of home-made and 'artificial' manures is a question to be decided by the analyst; but there can be no doubt to which the greater esteem is due when we refer to the offices they have respectively to perform. The economical manufacture and application of home manures as the cheapest method of maintaining the fertility of our soils, is a subject second in importance to none in the whole range of farm practice."

Parsnips for Hogs.—Parsnips are preferred by hogs to all other roots, and make excellent pork. By them they can be fattened in six weeks. A porker of mine 22 months old, and weighing net 750 lbs., never ate anything but raw parsnips and sour milk; and finer meat never was seen. In the use of parsnips for stock, they should never be washed, but be given as they are taken from the ground. Used in this way they are found not to surfeit the hogs and cattle, and if given freely to cows, will much improve the quality and quantity of their milk. [Prairie Farmer.

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* We do not speak here of the natural provision by which the soil is enabled to suffer large abstractions of its substance without an apparent loss of its fertility. No doubt the carbonic-acid-water which falls as rain rapidly dissolves out of the land fresh fertilizing matter in the place of what is removed by bad farming, but this cannot be urged as a justification; for under such circumstances it does but go to diminish losses, whereas under good management it would have the effect of increasing gains.

IMPORTANT INVENTION FOR THE GROWERS OF INDIAN CORN.

NEW METHOD OF DRYING GRAIN AND MEAL.

It needs no argument to show the great value of this invention, if it will, as stated—and, we doubt not, very honestly stated—"occupy less space, cost less money, take less fuel, and do more work than any other Dryers;" and when to this is added the fact that it proposes a system of desiccation which will defy the effect of sea voyages and of time—and, moreover, that, by means of it, corn meal may be delivered in England at a less price than their hay, who can fail to perceive the great power of this new invention for the benefit of the grain grower, or calculate the extent to which it will be brought into play? It is a problem to be ascertained, and the solution of which is not difficult, at what cost corn meal would profitably supersede oil-cake, barley, beans, oatmeal, &c., now used as food for domestic animals in England?

Turning back for some evidence of the sensibility we were conscious of having felt to the importance and the value to our country of employing *Indian meal* as food for cattle, and the increased demand which might be expected for that grain to be thus used, if it could be introduced in England, we find the following remarks, published in the American Farmer of April 2, 1819—more than 28 years ago—by the same hand that is now here recalling attention to that subject. It would seem to have been one of those coming events which "cast their shadows before." In a history then and there given of two remarkable beeves, the "Delaware ox" and "Columbus," fed and fattened by that experienced and judicious grazier and victualer, the late JOHN BARNEY, of Delaware, we made this observation, the correctness of which universal experience sustains: "He, Mr. B., considers that, as a means of fattening cattle, this country possesses, *in its Indian corn*, an advantage over England, for which she has no equal adequate substitute. He gives the preference to *Indian meal*, over *every other species* of food, for fattening either sheep or cattle, and gives it in its dry, unsifted state. But he gives it as his opinion that a much less quantity of meal will answer, and that it is eaten with better appetite, when used in conjunction with *ruta-baga*. Of this root he has the highest opinion, concurring with Mr. Cobbett in the belief that it is sweeter and far more nutritious than any other root or vegetable used as feed for live-stock." At that time corn at Baltimore was 55 cents a bushel. If this Dryer (which we do not doubt) will perform what is specified, then will the two impediments have been removed which have heretofore prevented the use of our Indian corn meal as food for stock in England.

First—Here is a mode of drying which prevents all danger of the meal becoming sour or musty; and, *secondly*, the ports of England have been opened to the importation of it. Let us exert ourselves for improvement in all departments; hold on, in the mean time, to that which is good, and hope for the best.

Any one having doubts to express, or inquiries to make, may address themselves to the Editor of THE FARMERS' LIBRARY, who engages, for the interest he advocates, to tell the truth though the Heavens fall.

REMARKS.

THE Patentee of "Stafford's Dryers" at a former period was very extensively engaged in milling and distilling, and for the past two years has devoted much of his time in investigating the means by which bread-stuffs may be preserved without deterioration, not only for home consumption, but for foreign ex-

portation. Numerous experiments having proved the impossibility of obtaining a uniform heat from hot air, as also the low degree of heat capable of producing a deteriorating change in the flavor of grain, flour and meal, when undergoing the process of drying; the Patentee is now confident that steam is the only agent that can be successfully used.

There is at present but one of the Patentee's Revolving Machines, on a large scale, in operation: this one is in the mills of E. W. Leonard, Esq., Elyria, Ohio, on which have been dried about 2,000 bbls. of Indian corn meal, a part of which is now on its way to Europe. Mr. Leonard's New-York correspondents write the Patentee that the meal sold has undergone a very severe scrutiny, and has been universally approved of by the Inspectors, and others who have used it.

The Cleveland Iron Manufacturing Company, who own the right for the Western Reserve, Ohio, are now erecting works for the manufacture of "Stafford's Dryers."

The recent partial destruction by fire of the celebrated Cleveland City Mills, prevents the Patentee from exhibiting samples of dried wheat flour, from a mill of known reputation, the Dryer for that mill having been nearly completed when the fire occurred. The patent having been but recently issued, the above-named are the only practical tests in which the Dryer has been applied; still sufficient is known to prove its practicability, and that its merits exceed those of any other other Dryer invented.

The surplus corn of the country, up to the present time, has been fitted for exportation by being dried with hot air, or by direct application of heat upon the surface of pans and in the inside of cylinders, which plans stand foremost in general adoption among the various methods which the importance of the cause has thrown into use, but all of which, although guided by great experience and undivided attention, impart to the grain or meal that scorched appearance and parched flavor which have effectually prevented home consumption, our own people preferring the natural color and taste, thereby leaving it for the consumption of the slave and colored population of the West Indies and South America.

The British Government having been compelled to throw open their ports for the admission of foreign grain, a demand has been produced which the people of the United States have been unable to supply. That demand has been, *bread-stuffs in a good state of preservation*. What have they received? Recent accounts inform us that nothing but the excitement which has now subsided, could have rendered marketable the article manufactured by the Drying Machines of all kinds which have been erected in almost every county in the corn-growing portion of the States.

The flood of emigration to our shores, together with the natural increase of population, are causing a yearly increase in the surplus bread-stuffs of the United States at a ratio unprecedented in the annals of any nation.

Our home demand and export to the West Indies and South America have heretofore absorbed our surplus, while the portion of surplus exported the past year has brought into requisition a great portion of the navy of the world. All will admit that the surplus of the coming year must exceed that of the past. What is to be done with it? What is to be done with the surplus of succeeding years? Capitalists or shippers will not invest in wheat, corn, flour, or meal, without deducting the risk of their becoming heated or soured on their hands. What is that risk? Does it not exceed one-fifth of the usual cost of the articles where produced or manufactured? If so, how essential to all who produce or deal in bread-stuffs, is a mode of certain preservation!

British manufacturers and British operatives have succeeded in opening British ports, that they may overcome the competition of Germany and other manufacturing States, and continue to supply the markets of the world. This they will effect if they encourage the use of Indian corn, as food for themselves, their cattle and swine. From the peculiar adaptation of our soil, Indian corn must always be produced with us in quantities to defy competition; which, preserved without deterioration, must become a chief supply of food to the poorer classes and the domestic animals of Europe. It is equally essential that the flour ground in the great wheat districts of the United States should have its moisture artificially expelled. It is generally known that Northern winter-ground flour sours readily if the ensuing summer is warm and moist. Wheat grown south of the natural district has less moisture because it grows in a less humid climate, and the atmosphere is better adapted to carry off the moisture during the process of manufacturing. The losses to millers, factors and consumers from this source within our own limits is greater than most persons would credit. These losses are so diversified that it is impossible to attain any correct estimate of the actual sum that is yearly lost by our people. If we send it abroad, subjected as it is to the damp and confined influence of a vessel on a long voyage, what losses will not then accrue?

If, during the process of drying, the grain is not well and perfectly ventilated when subjected to the greatest heat, the steam disengaged destroys its vitality and renders it unfit for food.

The usual mode of drying is to pass the grain rapidly over highly heated surfaces which burn more or less of the bran, thus flavoring the meal. The grain being highly heated is thrown into a pile where the hot steam generated from its internal moisture, passing through the mass, completes the work

of destruction. The grain when cooled is ground. The steam condensed, while cooling and remaining in the grain, is sufficient to create fermentation in the meal in a short time, if exposed to a warm climate.

Flour and meal being broken into small particles, their contact with a surface under a low degree of heat, rapidly expels the moisture from each particle if kept in constant motion. If, then, each particle is brought into contact with a not highly heated surface, and the ventilation being perfect, the process must be a perfect one. To farther impress the necessity of free ventilation, the Patentee states that the quantity of water contained in winter-ground flour, manufactured at the best mills in the North and Western States, varies from 11 to 20 lbs. per barrel; summer-ground contains from 10 to 14 lbs. Absolute dryness is not required to prevent flour from souring if retained in the northern climates of the United States, but enough moisture should be expelled to prevent fermentation.

Indian corn in the spring that will make 196 lbs. of meal contains from 30 to 35 lbs. of water; as the season advances the quantity of water lessens. These facts sufficiently prove the necessity of drying grain and breadstuffs artificially by a uniform heat, and having a perfect ventilation for the almost incredible amount of moisture which is expelled during the process of drying. Thus prepared, flour and meal can *never spoil* without being subjected to influences not usual in the storage of such articles. All grain that is heated and not musty may be restored to its original soundness. As soon as corn can be shelled it may be dried so as to be merchantable; this frequently occurs in the latter part of October, if the season has been dry; thus new corn may be brought upon the market in competition with the old if the price will warrant.

Cob meal (which is the corn and cob ground together) must become an article of large export from the United States. As an article of nutritious animal food it stands unrivaled; the cob contains nutriment until the grain is perfected, which does not occur until full six months after it is ripened (so termed.) The nutrition does not wholly consist in the saccharine left in the cob, but consists in its use in distending the stomach and intestines of the animal that perfect digestion of the meal may take place, while the effects of feeding the meal alone are that it sours on the stomach and produces a scouring effect. Animals differ from man in requiring their food prepared without deterioration from the natural flavor; hence cob meal can only be prepared with certainty by the process of steam heat and perfect ventilation.

Many persons are of the opinion that the experiment of sending corn and corn meal to Great Britain has been tested and failed. They only look upon the surface of things. The question arises, when bread-stuffs assume their usual level, At what rate can corn and cob meal be placed in British ports? For surely if they can obtain it low enough they can use it. Corn can usually be obtained on the Western rivers at from 15 cents to 20 cents per bushel; say 4¼ bushels per bbl., at 20 cents, is 85 cents—barrel 30 cents (tierces would cost less); freight to New-Orleans per bbl. 30 cents; charges at New-Orleans 10 cents; freight to Great Britain 60 cents; milling and drying 10 cents—is $2 25 net cost. Has corn meal (a good article) ever reached that figure in any of our own markets on the seaboard? The cost of cob meal would be considerably less—call it one cent per pound, delivered in Liverpool or London—just half the price of hay in those cities, and one-third of the price of oil-cake, of which the British take all our surplus.

With us it must come into universal use when it can be obtained.

The consumption of corn meal in our own cities and towns would be more than double could the people obtain it in a state that it would keep and still preserve all the freshness and flavor of a recently ground article.

Why is it that the cotton-gin is an essential to the South? Because with it only can they prepare their cotton for a market. Why, then, are not these Dryers, or some other efficient mode that will preserve our breadstuffs without change of quality, color or flavor, equally essential to the North and the great valleys of the West, which are and ever will be only producing States?

If Europe encourages the use of Northern and Western products, how dissimilar will our interests be from that of our Southern brethren?

The advantages claimed by the Patentee for the Rotary and Stationary Dryers over all others, are—

1st. That they dry all substances without the possibility of change of quality, color or flavor.

2d. They occupy less space, cost less money, take less fuel, and do more work than any other Dryers.

3d. The only attention required is to keep up steam sufficient to blow off at the valve weighed at any desired pressure.

4th. The motion of the Rotary Dryer, the feed of both Dryers, and the heat being uniform, with sufficient capacity of Dryer, a given amount of grain or other substances must be dried, without destroying their vitality.

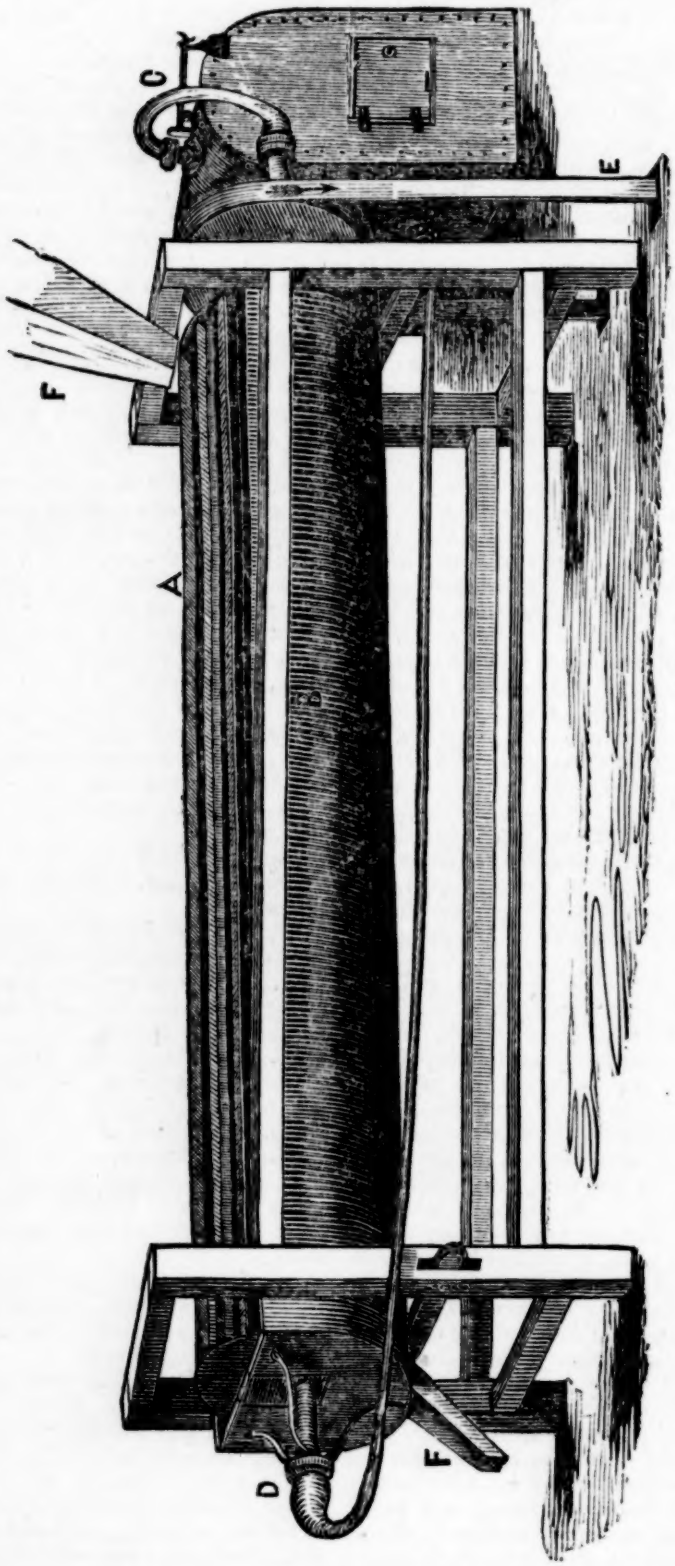
5th. That the principles involved and patented in these Dryers preclude the possibility of substituting any other efficient mode of attaining the desired end.

The Patentee is fully aware of the importance of his invention. Yet he knows that but a moiety of the benefits arising from its sale or use, can recur to him; he therefore offers to the public either to supply machines, or to sell territory in portions desired.

Letters post-paid, addressed to J. R. Stafford, Cleveland, Ohio, will meet due attention.

Cleveland, September, 1847.

Fig. 1.



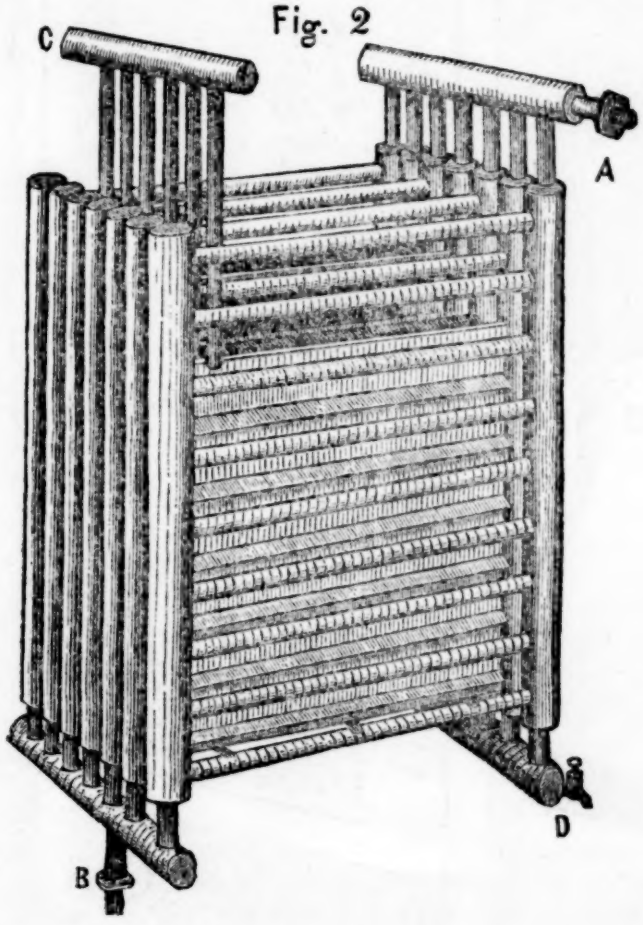
STAFFORD'S ROTARY DRYER.

DESCRIPTION.

Fig. 1 represents Stafford's Rotary Dryer and Cooler, for drying and cooling grain of all descriptions, flour, meal, and other substances.—A is a revolving cylinder made of iron, to which are attached numerous metallic flanches, as shown.

B is the trough in which it revolves; steam is admitted at C, which heats the cylinder and flanches; the condensed water is thrown out of the cylinder at every revolution and flows back into the boiler by the pipe D. The cylinder and trough lay on an incline as shown. Grain, flour, meal, or other substance, is spouted on to the top of the cylinder at the upper end. The cylinder is revolved in the direction of the arrows by means of the belt E. The substance to be dried is carried over the cylinder several times, gradually working its way to the lower end, where it is conducted off by the spout F. All ground substances may be retained on the cylinder until all the moisture they contain is expelled. Grain may have the greatest portion of its moisture abstracted on the cylinder, then be spouted into a pile, where the heat engendered by contact with the cylinder and flanches will carry off the balance of the moisture without injuring the grain. The different uses for which this Dryer may be adapted are as follows: For drying flour. *If by the miller*, it gives him a greater yield, as it bolts freer, and no flour adheres to the offal. He loses the moisture, but the 196 lbs. of flour will absorb again the water abstracted when made into bread. It preserves his flour, and the consumer pays him more money for it. *If used by the factor or commission merchant*, he is enabled to preserve flour that he fears will sour. *If used by the distiller*, it enables him, 1st, to extract the sour water from corn, which promotes acetous fermentation before the vinous or saccharine fermentation has developed the spirit contained in the grain. 2d. It enables him to bolt and separate the meal, that the fine and coarse may not be scalded together, as the scald sufficient for the barm would destroy the fine. 3d. It enables him to get rid of the hulls, which, when saturated, sink to the bottom of the vat, and are forced to the top during fermentation by the quantity of carbonic acid gas generated under the mash—a portion of which gas distills into carbonic acid, which is known as the most fatal ingredient to saccharine fermentation.

Fig. 2



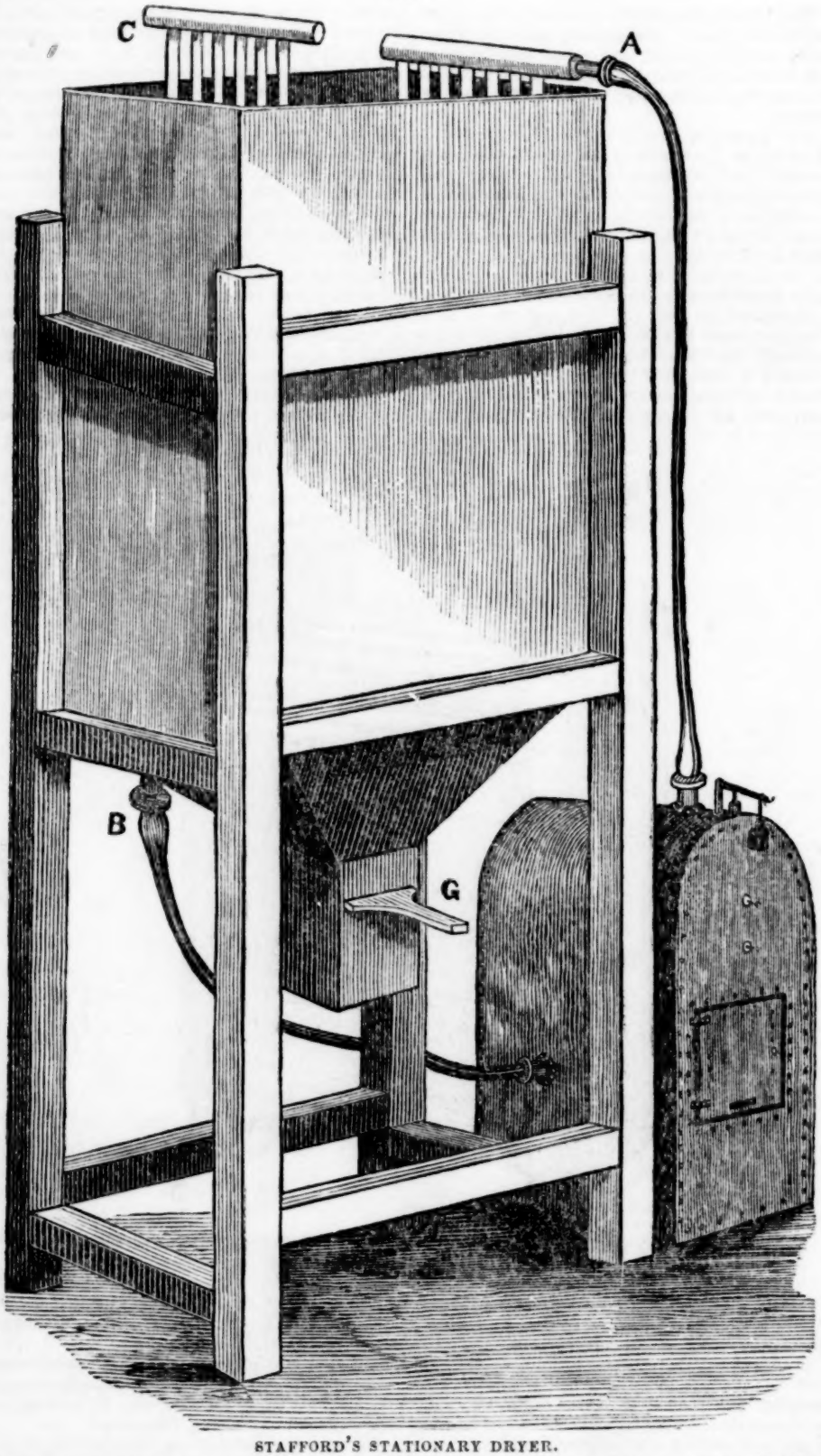
If used by the brewer, it enables him to dry his malt more speedily, with less labor and expense, and to dry it without change of flavor or color.

If used in a steam saw-mill, the escape steam may be used to heat the Dryer, and the saw-dust as it comes from the saw may be poured over the cylinder, dried and consumed.

If used by the miller, warehouseman, or shipper, for drying grain, it accomplishes the object without the least possible risk of injury to color or vitality.

The claim upon which the patent for the above

Fig. 3.



STAFFORD'S STATIONARY DRYER.

is based covers the principle of drying on the surface of cylinders: and, as flour and meal are not conductors, it is absolutely indispensable that all the particles should come in direct contact with a heated surface. and should almost immediately be exposed to a free ventilation, that the moisture can escape. This can only be done on the outside of a cylinder, for when done

on the inside a sliding motion is given to the mass. If flanches are attached to the inside to give a falling motion, the air circulating through the cylinder must carry off the finer particles as well as cool the cylinder. The difference between drying on the inside or outside of a cylinder of 40 inches diameter, is that the grain or meal cannot occupy more than 40 inches of surface in the former, while it occupies 360 inches of surface of cylinder and flanches of the latter; and instead of heating massive ovens *(when it is impossible to keep a uniform heat)* for pans and cylinders to revolve in, the heat generated within a cylinder is all absorbed by the substance drying. The following is the claim referred to. It will be observed that no particular form, size, device, or heating agent is patented, but the principle is amply reserved.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the method of drying or cooling grain, flour, meal, or other substances, on the *external surface* of a hollow cylinder armed with flanches or *other devices*, arranged and operating *substantially* as herein described, and combined with a trough: the cylinder to be filled with hot air or steam when used for drying, and with cold air when used for cooling purposes, as herein described and set forth.

Fig. 2 represents Stafford's Stationary Dryer when removed from the case. The steam is admitted at A, figs. 2 and 3, and fills the tubes; when condensed it passes back into the boiler by the pipe B, figs. 2 and 3. Pipe C connects with a series of flat perforated tubes, into which the vapor from the grain disengaged by the heat is conducted through numerous apertures which are under incline I, I, I. The inclines also serve to direct the grain on the heating tubes. Grain or other substance to be dried is admitted into the Dryer by a spout above it, and obtains its exit through the regulating gate G. D is a faucet for drawing off the condensed water that may accumulate in the small portion of Dryer shown. Grain may be retained within the case until all the moisture is expelled from it, or a majority of the vapor may be disengaged, when if spouted into a pile the heat retained will disengage enough of what moistnre may remain as will leave the grain in a safe condition for shipment. Damp grain should remain for some time among the tubes to insure it against fermentation and injury in the pile. It will be seen that this Dryer requires NO MOTIVE POWER. It requires but little fuel or boiler, as the condensed steam is returned to the boiler as fast as it is condensed. To dry 5,000 bushels of grain per day would not require the occupation of more than *six feet square on a floor!* It will be perceived by the following claim that the invention is not limited to any peculiar form, but that it comprehends the *only effective stationary Dryer that can be constructed.* Its uses are principally adapted for drying grain; ground substances would clog the tubes and apertures which carry off the moisture.

CLAIM.—What I claim as my invention, and desire to secure by letters patent, is the improved apparatus for drying grain or other substances, composed of a box or casing, having a regulating gate at its base, and having a series of heating tubes or *surfaces* within the casing, combined with a series of perforated tubes or *other devices* for carrying off the vapor disengaged by the heat; the whole arranged, combined, and operating upon the grain or other substance during its passage through the box or casing *substantially* in the manner herein set forth.

J. R. STAFFORD.

HEMP AND FLAX HUSBANDRY.

IN THE FARMERS' LIBRARY of May last appeared an engraving of a Flax-Brake, then just invented by F. P. HOLCOMB, Esq. of Delaware, which gave fair promise of supplying the desideratum so long wanting on that subject—to wit, an expeditious preparation for the manufacturer, without injury to the fibre. Whether, Delaware not being a hemp-growing State, the machine has not enjoyed an opportunity of being favorably introduced; or whether the machine itself, though good in principle, may have been deficient in power; or what was or is the precise difficulty, if any, we have not understood, but would like to be informed—because, although we gave it only for what it was worth, and what was honestly believed by our correspondent to be its capacity and value, still we recognize the obligation which rests upon us always to tell the *cons* as well as the *pros*—the against as well as the for—whatever may be recommended in the pages of THE FARMERS' LIBRARY. *Fiat justitia ruat cœlum.* Of the machine which we take pleasure in here presenting to public notice, and especially to the notice of all concerned as cultivators or manufacturers, in the Flax and Hemp Husbandry of the United States, it may with confidence be said in its favor that few persons, if any, in the United States, have given as much attention to the subject, in all its aspects, with equal capacity and opportunities to form a safe

and correct judgment, as Mr. ANDERSON, of Louisville, Kentucky, the patentee of the Brake.

Then of Mr. SANDERS—who we believe has the agency for selling the rights—on personal knowledge we can add that he is among the oldest and most zealous promoters of agricultural improvements in our country, and that he has passed the best portion of an active and useful life in the midst of a Hemp region.—Moreover, it may be farther stated that one of the largest and most accomplished manufacturers of Hemp and Flax in this country, anxious on this subject, and every way disinterested in this case, has expressed to us his strong persuasion that in this machine we are at last presented with the long-sought *desideratum;* that is, one which will expeditiously prepare the article for the manufacturer, while it develops and preserves the fibre in all its elasticity, strength, and every valuable quality.

MR. SKINNER: NEW-YORK, September 20, 1847.

Sir—An old correspondent of *your* American Farmer wishes to call the attention of persons interested in the growth and in the manufacture of Hemp and Flax, to the recent discoveries made by Mr. JAMES ANDERSON, of Louisville, Ky., both as to the preparation of Hemp and Flax, and to his newly-invented Brake.

First as to the preparation: It is a fact well known to modern chemists that organic vegetable matter which contains nitrogen in the largest quantities is most prone to fermentation and putrefaction, which occurs spontaneously when it is subjected to moisture and heat.

Hemp or Flax contains nitrogen or azotized matter, and of course readily runs into spontaneous fermentation when exposed to moisture and heat.

In preparing Hemp or Flax for the Brake, persons heretofore have availed themselves of the process of *dew* or *water* rotting, in which the greatest care is required not to materially injure the fibre; but no Hemp or Flax can pass through these processes without more or less injury. Even under the most skillful treatment the fibre is partially weakened; but the maceration and decomposition has been found necessary to enable the operator to readily brake and clean it.

The albuminous matter which is incorporated in the harl of Hemp and Flax, in large quantities, with the fibre, is the first to decompose; it therefore becomes necessary to render that insoluble and the azotized matter therein inert, if it is retained.

Mr. Anderson effects this by the application of any known antiseptic. He has used the sulphate of iron, and also the sulphate of alumina and potassa, with satisfactory results—producing a chemical change in the azotized matter in the Hemp; rendering it unsusceptible of either fermentation or putrefaction; giving unusual durability; adding greatly to its strength; producing an article superior to the best Russia Hemp.

Vats of wood or masonry are constructed, suitable for the farm. As soon as the Hemp is cured, the operation may begin. For the convenience of putting in and taking out, it should be tied in convenient sized bundles, cutting off the seed ends (five or six inches) with a broad-ax, on a block, handling it neatly; the vat then to be filled with as much Hemp as it will hold. For every fifty gallons of water required to fill the vat after the Hemp in the straw is placed in it, dissolve four ounces of the sulphate of iron, which is recommended for Hemp; fill the vat with this liquor; then, as soon as it is fully saturated, it is finished. Ten or twelve hours is long enough, but staying in longer does no injury; as soon as it is dry it is ready for the Brake.

Pursue the same process for Flax, but, instead of the sulphate of iron, use the sulphate of alumina and potassa. The alum liquor does not change the color—the iron liquor darkens it. By this process the farmer gets his crop to market at least six months sooner than by either dew or water rotting—the product being at least sixteen per cent. greater, as there is little or no waste from tow or over-rotting.

Test experiments have been made in Louisville, Kentucky, taking four samples of Hemp.

No. 1, a sample of Dew-rotted Hemp.	No. 3, a sample of Riga Rein Hemp.
No. 2, .. Water-rotted ..	No. 4, .. Rhodian* ..

These samples were subjected to moisture and heat alternately, each treated precisely alike. No. 1 first became decomposed; next No. 2, and soon after it No. 3: all three completely rotten—No. 4 remaining sound, strong and sweet.

As to the Brake: I send you a drawing of the model of the Brake, deposited by Mr. Anderson in the Patent Office; since then, however, he has changed his plan of working the rollers. As soon as I return to Louisville I will send you a drawing of the perfect machine. It is very simple, and easily made—costing about $200 for a machine. The rollers and gearing are made of cast-iron—the frame of wood. But little power is required to drive them; two horses will be sufficient for one machine, cleaning a ton of Hemp per day.

LEWIS SANDERS.

I have left at the American Institute, in the City of New-York, four samples of Flax, for the examination and inspection of persons interested in its growth or manufacture:

Flax in its natural state.	Flax steeped 12 hours in iron liquor
.. water rotted.	.. .. .. alum ..

THE COMPOSITION OF FLAX,

AND HOW TO MANAGE ITS CULTURE WITHOUT INJURY TO THE LAND.

As connected with the preceding communication relative to the discovery of a new and effectual Hemp and Flax Brake, by Mr. ANDERSON, of Kentucky, we give the following from a recent Lecture by Professor JOHNSTON:

COMPOSITION OF THE ASH OF THE STEM OF THE FLAX PLANT.

CONSTITUENTS.	Heestert Courtrai District.	Escamaffles Courtrai District.	Hamme Antwerp District.	Holland.	Near Dublin
Potash	7·697	22·857	22·30	18·41	9·78
Soda	19·186		14·12	10·91	7·70
Chloride of sodium	8·213	8·701	4·59	5·65	3·99
Lime	15·279	16·483	18·33	18·37	12·53
Magnesia	5·446	3·332	3·93	3·02	7·79
Oxide of iron	4·501	1·523	1·10	2·36	
Alumina	0·444	0·438	0·72	1·44	6·08
Oxide of manganese	trace	trace	trace		
Sulphuric acid	6·280	6·174	6·83	9·68	2·65
Phosphoric acid	11·206	11·802	8·81	11·06	10·84
Carbonic acid	20·599	25·235	16·38	13·75	16·95
Silica	3·056	3·409	2·68	5·33	21·55
Total	100·007	99·954	99·99	99·98	99·46
Per centage of ash	4·237	5·454	3·67	5·15	5·00

After a few remarks on this Table, Professor JOHNSTON went on to say that as in medicine a knowledge of the disease was half the cure, so in Agriculture a knowledge of the disease—for they might call that a disease which was an exhaustion of the soil—enabled them to supply to the soil what was taken from it by the crop. As a means of doing this, he showed that if the seed and bole and husk were mixed, they formed excellent food for animals, and in proportion as they saved these things they increased the quantity of manure. He need not explain how the seed was used in fattening cattle; he would only say that the seed and bole contained the combustible matter of plants, that which by a wonderful process of chemistry in the bodies of animals became transformed into bone, muscle and flesh, and finally escaped from the animal, to enable them to grow richer and richer crops. The subject of employing the seed he would leave to those who had to follow him; and with regard to the increased value of the manure, he referred to Warnes's system of box feeding, which was designed to insure not only a larger quantity of beef, but to increase

* The name given to Mr. Anderson's new process.

the quality of the manure by the manner in which it was made; and, as far as he understood it, he thought manure was rendered more valuable to them than by the ordinary system. He had prepared a recipe to restore to the soil the ingredients which were taken from it. It was as follows: *Manure for Flax.*—Bone dust, or bones dissolved in sulphuric acid, 25 lbs.; gypsum, 10 lbs.; pearlash, 20 lbs.; soda ash, dry, 20 lbs.; slaked magnesia lime, 25 lbs.; or for the last may be substituted crude sulphate of magnesia, 20 lbs.; and quicklime mixed with it, 5 lbs. 150 lbs. of this represent 150 lbs. of the ash of the plant, or 200 lbs. of the dry plant, say a ton of dry flax. An average crop is 800 lbs. 50 stones dressed flax, or 6,400 lbs. (three tons nearly) flax plant, containing 320 lbs. of mineral matter. 4 cwts. to 6 cwts. of the above must be added to the land to supply the loss; or 3 cwts. and a good half manuring. The Flax Society of Ireland stated that experience showed that a flax crop was best after wheat, but the practice varied according to the district, and something must be left to the discretion and more to the judgment of the agriculturist. Flax of good quality should be pulled before it was dead ripe. Very great care was indeed required generally in the management of flax. The times of steeping and pulling and grassing must be carefully attended to, as, if left a day too long under these operations, the quality of the fibre would be affected. It should be cultivated by persons who can look after it themselves, for if left to a second person, there might be a considerable loss of profit. The seed should always be saved; and lastly, there should be but one crop in seven years. He did not say that Chemistry would not enable them, in time, to have a frequenter crop of flax, but they must depend more upon the mechanical condition of the soil. If they used implements as the means of improving the mechanical condition of the soil, and Chemistry for its chemical improvement, he believed the time will come when they would grow any crop they pleased on any soil they liked, with profit to the farmer.

LINSEED AND OIL-CAKE, AS FOOD FOR STOCK.

DIFFERENCE IN VALUE BETWEEN FOOD CRUSHED AND UNCRUSHED.

SOME notion of the earnestness and progress of agricultural investigations, as they are going on now in England, may be obtained from the following observations by H. S. THOMPSON, Esq. at a public meeting in England, where the subjects of lecture and discussion were—the Culture of Flax, and the Value of Linseed and Oil-Cake.

It is scarcely necessary now to inform the reading farmer that the great inducement there to the use of Linseed and Oil-Cake—the latter of which is consumed in great quantities as food for stock—is the *richness that they impart to manure*. But for that consideration it is doubtful whether they would be used in that way; just as our Yankee farmers would forbear to rear and feed their own hogs, but as *manufacturers of manure*.

There are few things about which there is in this country less general information than on the subject of the extent and value of Oil-Cake or Flax-seed as food for domestic animals!—to what extent used—where purchased—at what price—with what effect—and might not both be used in that way much more extensively and with economy? We will give a year's publication of THE FARMERS' LIBRARY AND MONTHLY JOURNAL OF AGRICULTURE, making two volumes of 600 pages each, as a premium for the best Essay which may be supplied on the subject at any time between this and the first day of January next—with exact references to places, prices, quantity to be used, and cost as compared with corn meal, &c.

H. S. THOMPSON, Esq. said the question had been so fully and so ably discussed by Professor Johnston, and he had touched on so many points bearing upon the subject, that he should endeavor to be as brief as possible in the few remarks which he wished to make. There were a few points connected with the use of the seed when grown in this country. The first point on which I shall make any remark is, the comparative advantages of using

Linseed and Linseed cake. The ease with which a few cwt. of Linseed cake can be procured when wanted, and the very trifling trouble attending its use, are strong arguments in its favor; and I will at once admit that no equally convenient substitute can be found for those who go on the make-shift system, and who merely order a few cwt. of cake when their turnips come to an end, or to finish off a rather better bullock than ordinary. I am confident, however, that the time is not far distant when the great majority of farmers will see that the best way of keeping their farms in a productive state is to fatten a certain number of beasts for every hundred acres of arable land; and to any man who arrives at this conclusion, I have no hesitation in recommending the use of *Linseed* in preference to *cake*. In the first place, we know that the inferior samples of Linseed are always selected for crushing—so much so that, taking the quotations from the *Mark-Lane Express* of last week, I find that the price of English Linseed for sowing was from 50s. to 60s. per quarter, while that for crushing was from 46s. to 49s. It is hardly necessary for me to mention that this difference in price is entirely owing to the difference in quality. A parcel of seed which is so full of seeds of weeds, or which has been so much damaged on its voyage as to be quite unsalable to those who buy for their own use, has only to be passed through the mill to be transformed into what goes by the name of a very useful cake. It may be thought difficult to select a sample of Linseed, but a very little practice will enable any man to ascertain the only three particulars which are important, viz. the weight, color, and freedom from seeds of weeds. The next point of superiority of seed over cake is the value of the oil as an article of food. As Professor Johnston has so fully explained the scientific part of the subject, I will only state that to keep up the heat of the body, especially in cold weather, the animal lamp requires as constant a supply of fuel as the lamps in our houses, and I believe they cannot be more economically supplied than by the oil which is contained in a moderate daily allowance of prepared Linseed. In Mr. Marshall's Prize Essay, published in our Transactions of last year, you will find other advantages mentioned as the result of using Linseed as food for cattle; and as I have followed his plan for one whole winter and part of another, with the best results, I can safely recommend it to all who have a sufficient number of cattle to make it worth their while to put up the necessary apparatus. As soon as I had ascertained that this method of feeding cattle was successful, I thought it desirable to try some experiments, with a view to determine the degree of fineness to which it is advisable to crush the seed, and the length of time required to boil it, so that the whole goodness of the seed might be extracted during digestion.—My first point was to ascertain whether it was absolutely necessary to crush the seed at all; the plan I adopted to satisfy myself was that of boiling a certain quantity of whole seed, and an equal weight of crushed seed. I then washed each separately on a fine sieve, and when dried at a heat of 212°, I weighed them again to ascertain what each had lost. I found that

	Soluble.	Insol.
1000 grains of uncrushed seed, boiled one hour, gave	155	845
1000 ditto, crushed ditto	475	525
845 grains crushed and boiled again one hour, gave	351	494
525 grains re-crushed and boiled again ditto	83	442

This and other experiments of the same kind, from which I obtained similar results, made it quite clear that the unbroken seed was able to resist to some extent the action of boiling water, but it was still possible that the nutritive matter contained in the seed might be extracted during digestion. I accordingly had a certain quantity of seed boiled two hours, and given whole to one of my beasts. The herdsman was then directed to wash a portion of the dung and examine it closely. A certain portion of the seed was in this way found to have passed through the animal whole, and, after being well washed and dried, was compared with a portion of the seed which had been boiled, but had not passed through the animal:

500 seeds digested after boiling two hours, weighed	27½ grains.
500 ditto boiled two hours	27 3-10 do.
500 ditto fresh	38½ do.

To make it still more certain that the seed which had undergone the process of digestion was still of value, he had a certain portion of it crushed and boiled an hour, when 100 grains gave 81 soluble and 19 insoluble. In this experiment it was found that a considerable portion of the seed had been crushed by the teeth of the animal, as there were numerous skins of the seed mixed with those that were still whole; and in all cases where the skin was broken, the whole of the kernel had gone—thus showing that the gastric juice had the power of fully dissolving the kernel when the seed was crushed, however roughly. I tried numerous other experiments to ascertain how long it should be boiled. These it would be tedious to relate, but the results I would shortly state as follows: First, that if the seed be well crushed, boiling for one hour will extract the goodness of the seed as completely as boiling for three or four hours if roughly crushed. When, however, the meal is fine, there is great danger of its burning to the bottom of the pan, unless cooked by steam.—There seems, however, to be no necessity for either fine crushing or long boiling. Either one or the other makes the gruel thicker and more glutinous; but the animal has certainly the power of extracting all the nourishment from the seed when roughly crushed and lightly boiled; and to do more than make it digestible would of course be superfluous labor. The last point which I shall mention is that those who may wish to use Linseed on a

small scale may do so at a very trifling expense by boiling it in a common iron pan or boiler; and to prevent any danger of its burning to the bottom, the Linseed may be put into a coarse canvas bag, hung by a string to a stick, laid across the boiler—the string to be of such a length that the bag cannot touch the bottom of the pan. After boiling for a short time, the bag may be turned inside out, and the gruel mixed with the chaff or chopped straw. To recapitulate shortly: I prefer Linseed to cake, because I know what I am giving to my cattle, and on account of the value of the oil contained in the seed. I also consider it indispensable that the seed should be crushed, but do not think it necessary to have it made into meal. Lastly, it is a mistake to suppose that any expensive apparatus is required, as the price of a seed-crusher is not more than that of a cake-crusher; and the only other utensil indispensably required is a common iron pan or boiler, which almost every farmer already possesses.

AN ESSAY ON THE CONDITION OF A STALLION.

The word *condition* is used by horsemen in a different sense from that in which it is understood as applied to cattle by the mass of farmers. By *condition* the farmer often means a high state of fatness; the horseman, on the contrary, makes use of the word to indicate the greatest health and strength produced by *reducing* all superfluous fat, bringing the mere flesh into clean, hard and powerful muscle, and invigorating the lungs and other internal organs, so that they may promptly discharge their respective functions, and suffer no damage from uncommon stress—the whole in order to the animal's performing labors and sustaining a continuance of action to which he would not be adequate without such especial preparation.

By the *Condition of a Stallion* is meant the state of the system in which the male horse should be kept, in order to deriving from him the greatest excellence in the progeny.

Too many persons are content to breed their mares to a horse whose figure suits them, without regard to his *condition.* The mention of one prominent instance alone will be sufficient to show that good condition is essential to the production of a valuable progeny. A remarkable case occurred in England some years since, in so high a quarter as to attract public attention, and consequently the fact of the account's obtaining currency without contradiction is a fair evidence of its correctness. The Prince of Wales, who afterward became George the Fourth, owned, and was in the habit of riding as a hunter, an entire horse of unequaled excellence. In consequence of this horse's superior qualities, His Royal Highness caused a few of his own mares to be bred to him in the spring, after he had been kept in the highest condition as a hunter throughout the winter, and the produce, on growing up, proved every way worthy of their sire. When His Royal Highness, as Prince Regent, became seriously engaged in the cares of Government, and therefore relinquished the pleasures of the chase, being desirous to perpetuate the fine qualities of this stock, he ordered the horse to be kept at Windsor for public covering, provided the mares should be of the first quality; and in order to insure a sufficient number of these, directed the head groom to keep him exclusively for such, and to make no charge, with the exception of the customary groom's-fee of half a guinea each. The groom, anxious to pocket as many half guineas as possible, published His Royal Highness's liberality, and vaunted the qualities of the horse, in order to persuade all he could to avail themselves of the benefit. The result was, the horse being kept without his accustomed exercise and in a state of repletion, and serving upward of a hundred mares yearly, that the stock, although tolerably promising in their early age, shot up into lank, weakly, awkward, leggy, good-for-nothing creatures, to the entire ruin of the horse's character as a sire—until some gentleman, aware of the cause, took pains to explain it, proving the correctness of their statements by reference to the first of the horse's get, produced under a proper system of breeding, and which were then in their prime, and among the best horses in England.

Almost every observing farmer in this country has remarked that whenever, within his knowledge, an ordinary work-horse has, by chance, covered a tolerably good mare, the foal thus produced has, at maturity, almost invariably become a better animal than it was expected to be, and in many cases proved quite superior to the get of the high-priced and highly pampered stallions of the neighborhood. What was the cause of this? Condition. The work-horse, by constant and severe exercise, was brought into health and strength, and his stock partook of the state of his system at the time of copulation. Why is it that many experienced farmers, after having tried the best stallions within their knowledge, frequently resort to the keeping of one of their own colts or farm-horses entire, for the service of their mares, and actually obtain as large and as good and salable stock from such a one, as that from the public stallions of far superior size, form, blood, and all other qualities, except this indispensable *condition?*

It may be stated that, generally, whenever the get of a stallion has proved, at maturity, to be of remarkable excellence comparatively with the sire, such horse has been, at and previously to the time of getting such valuable stock, kept without pampering, without excessive sexual service, and with a good share of exercise or labor.

To show the effect of a peculiar state of the system in the parents at the time of copulation, instances may be cited from various sources. We will content ourselves with two—and first take a lamentable case in the human species as given in the valuable work on "The Constitution of Man," by George Combe:

"In the summer of 1827, the practitioner alluded to was called upon to visit professionally a young woman in the immediate neighborhood, who was safely delivered of a male child. As the parties appeared to be respectable, he made some inquiries regarding the absence of the child's father, when the old woman told him that her daughter was still unmarried; that the child's father belonged to a regiment in Ireland; that last autumn he had obtained leave of absence to visit his friends in this part of the country, and that, on the eve of his departure to join his regiment, an entertainment was given, at which her daughter attended. During the whole evening she and the soldier danced and sang together; when heated by the toddy and the dance, they left the cottage, and after the lapse of an hour were found together in a glen, in a state of utter insensibility, from the effects of their former festivity; and the consequence of this interview was the birth of an idiot. He is now nearly six years of age, and his mother does not believe that he is able to recognize either herself or any other individual. He is quite incapable of making signs whereby his wants can be made known, with this exception, that when hungry he gives a wild shriek. This is a case upon which it would be painful to dwell, and I shall only remark that the parents are both intelligent, and that the fatal result cannot otherwise be accounted for than by the almost total prostration or eclipse of the intellect of both parties from intoxication."

For another instance of a peculiar constitution derived from a parent at the time of copulation, and owing to a temporary excitement of the animal, a respectable farmer related to the writer of this Essay that he witnessed the effect of pain and nervous agitation on a stallion just before the moment of covering, in the production of a wild, timid, violent and worthless colt. The sire was in repute as one of the best horses ever kept in the district; and his stock afterward justified the opinion. The groom became angry and beat him in his stall in a cruel manner, and then led him out and allowed him to cover the mare, which was one of a perfectly quiet and orderly temper. The consequence was the production of an animal totally valueless, as above mentioned.

That the doctrine here held is no "new thing under the sun" is evident from many venerated authors. Plutarch says "The advice which I am now about to give, is indeed no other than what hath been given by those who have undertaken this argument before me. You will ask me what is that? 'Tis this, that no man keep company with his wife for issue sake, but when he is sober—as not having before either drank any wine, or, at least, not to such a quantity as to distemper him; for they usually prove wine-bibbers and drunkards whose parents begot them when they were drunk: wherefore, Diogenes said to a stripling somewhat crack-brained and half-witted, 'Surely, young man, thy father begot thee when he was drunk!'"

Shakspeare intimates the same belief in making a hero insult his enemies with the taunt "For ye were *got* in fear."

On no other known principle than this *condition*, or a peculiar state of the system at and before the time of copulation, can be explained the important fact which forms at once a criterion of skill in the scientific breeder, and a stumbling-block to the ignorant and unreasonable one, who would expect success without giving himself the trouble of investigating the natural laws which govern the subject of his operation: such a person is too apt to argue within himself that because the same parents at different times produce offspring of opposite characteristics, there can be no certain rules by which to create determinate qualities in the progeny; such a one would maintain that, because all the children of one married couple are usually somewhat different in characteristics from each other, there can be no means of predicting, with an approach to certainty, the qualities to be produced in the offspring by a particular sexual intercourse. Now this *law of condition* accounts for the difference between individuals produced at several births from the same parents. The case of twins, in the human species, serves to strengthen this argument, inasmuch as the two persons produced at one birth usually bear a close resemblance to each other, in all respects.

It is known that ideal impressions on the female parent, subsequent to conception, frequently take permanent effect on the offspring. That such causes do not usually give the leading characteristics to the progeny, is evident from these considerations:

1st. The consequences of such impressions on the female, are usually somewhat of an unnatural or monstrous order, being different from the traits of either parent, and from the common nature of the variety to which the animals belong.

2d. It is a settled point with breeders that the progeny is more strongly characterized by the traits of the male, than by those of the female parent. This fact is well known; and indeed it can hardly be expected otherwise than that the sex which bears so much the stronger impress of character, should impart the more visible resemblance to the offspring.

3d. It is an ascertained law of Nature, that peculiarities of climate, food, occupation and most other circumstances affecting the well-being of an animal, produce in its constitution a change such as is necessary for the welfare of the species; and that this proceeds throughout many generations, until the animal becomes completely adapted to the circumstances of its existence. [The same thing occurs in the vegetable kingdom.]

This last consideration, of the gradually altered state of an animal through successive generations, is a strong instance of the effect of *condition;* and it is by a regard to this invariable law of Nature, of self-adaptation to circumstances, that the cultivation or improvement of any breed is to be effected. "Hence the most acid and worthless grape is by skillful culture rendered sweet and luscious; flowers without attraction are gradually nurtured into beauty and fragrance; the cat may be made to present all the rich colors of the tortoise-shell, and the pigeon may be 'bred to a feather.'"

Let us now endeavor to deduce a useful, practical conclusion from the foregoing arguments. If our doctrine be correct, the horse-breeder will depend upon the *condition* of the stallion, in order to the procuring of valuable stock from him, as well as upon his other qualities of pedigree, speed, action, bottom, wind, temper, spirit, form, style, size, color, &c.

The next practical question is, how this condition is to be attained, and how the animal is to be kept at the required standard in this respect. The requisite *condition* is only to be attained by *training* for health and strength in a great measure according to the system of training for races: supplying an abundant nourishment of the best quality, allowing sufficient periods of repose for digestion, and giving regular and strong exercise, the whole with such variations as only experience and close observation, under constant practice, can dictate.

The aptitude of an animal to benefit by training is often inherited, like other qualities, from its parentage; and judicious breeding alone can insure a continuance of the desirable quality, or create a propensity for it by proper crossing, when it does not exist in the parents.

The age at which the horse is best adapted to undergo a course of training, is just at the close of his most rapid period of growth, while the system is in its

greatest freshness and vigor. This period is at about five years old. The powers of a horse will augment by suitable treatment in this respect until about the age of nine years: and, in order to obtaining the most valuable stock, a stallion should not be put to service before attaining a full development of his powers, nor kept at it after his form or energies appear to be affected for the worse. He should be, then, between five and fifteen years of age, if of an ordinary constitution; but if of remarkable energy and endurance, and exhibiting no symptom of debility, may be continued until past twenty.

Trainers find their endeavors to produce the highest state of strength, in an animal, greatly impeded by any excitement of the sexual appetite. It is then the more necessary to keep the horse in a state of training throughout the year, impressing most forcibly a tone of health and strength upon his system at the time when his nerves are liable to the least distraction; and continuing the course carefully throughout the season of copulation; never allowing such excess of service, or of the excitement of sexual appetite, as to induce a disturbance of spirit or temper, or a relapse from the most thoroughly strong, healthy and regular tone of the system. G. B.

Contrary to the system laid down by 'G. B.,' and which is urged with plausibility and force, the practice with too many is to keep the stallion through the season, as hogs are kept to carry them to the greatest possible weight in the shortest time, to which end it is deemed best to make them eat as much, and sleep as much as possible. Is it reasonable to expect a vigorous and sprightly offspring from an animal in that condition? The truth is that in the range of a farmer's occupations, there are few things that require more care and consideration and skill than in the department of *breeding his stock*. &c. Yet there are few in which less skill is possessed, or less consideration is exercised. For maintaining animals of various kinds, in their highest form and qualities of excellence, if the truth must be acknowledged, we have not among American husbandmen generally, the practiced judgment, the leisure, the conveniences, or the capital; neither have we the stimulus to close and persevering attention to be produced by the certainty of demand at remunerating prices. Hence the general deterioration which marks the descendants of choice imported animals—unless the Horse be an exception. To him our climate is particularly congenial, and improvement has been maintained by the high prices, still to be had from opulent men in the cities, for superior match horses. Another auspicious influence was that of the *turf*, but that declining almost to extinction, a corresponding effect will be visible after some years on the shape and powers of the Horse. We remember once, at the table of the British Ambassador, to have asked the late J. Randolph, of Roanoke, whether Virginia maintained her ancient superiority in the character of her horses; to which he answered, promptly, "No, Sir, far from it—far from it, Sir. Since we gave up horse-racing and turned up the whites of our eyes, our horses have sadly depreciated."

The Rhubarb.—The leaf of the common garden rhubarb is a fine display of the order of vegetable nature. It is common to find them about two feet square, and containing over 500 square inches. We noticed a lover of Nature examining one a few days ago and making a calculation, the result of which, for its curiosity, we will give. He found that on the surface of the single leaf could be traced more than two miles of distinct canals through which the nourishment passed to give life and vigor to the leaf. These canals being about the sixteenth of an inch apart, divided the leaf into 130,000 fields, each as distinct to the eye as the division by walls of the grass and grain lands of the well cultivated farm. As lateral fibres, more minute than the unaided eye can discover, pass in close contiguity through these small fields, there is no doubt that could all the canals for circulation in a single leaf be extended in one line, they would reach the distance of ten miles.

☞ At the Utica Woolen Factory from 350,000 to 375,100 lbs. of fleece wool are required annually for manufacturing, at a cost generally of about $125,000. The cloth manufactured daily exceeds 450 yards. The quantity of goods sold each year will amount to upward of $300,000, whereas the cost of buildings, machinery, lots, &c., does not exceed $75,000, the whole of the machinery being now in full operation. The wool purchased since 1st June last by the Company, is about 384,000 lbs., costing about $115,000.

HOW SHOULD A CATTLE-SHOW BE REPORTED?

"MANY men of many minds"—some take a lively interest in one department of Cattle-Shows, some in another—though, in our country, it must be confessed, the great mass of people have their eyes and feelings engrossed almost exclusively with the *animals*, and especially the horses. Bring on a goodly number of roaring bulls and fat cattle, and twenty prancing stallions, with the razor-strop man, a live monkey, Gen. Tom Thumb, and a boa-constrictor, and most people go away in *ecstacies* with the *show!*

The very distinguished Editor of the London Agricultural Gazette, Prefessor LINDLEY, seems to have been puzzled to know what to report. His case reminds one of the old man, his son and the ass—which should carry which? As we correspond exactly with the Professor in his opinion, we venture to give what he says:

> The English Agricultural Society hold their annual meeting a month hence at Northampton. Will any kind reader give his advice as to how their proceedings should be reported? What subjects should engage most of the reporter's attention? To the report of what should the largest portion of his space be devoted? His object on past occasions has been to excite those feelings and to record those facts which the reader would himself have experienced and ascertained had he been present; and this, however unattainable in perfection, is, of course, the result at which he proposes to aim. But he may err in his judgment of the relative importance of the many objects there offered to view, and whatever course he adopts he cannot hope to satisfy all. And thus he cannot be wrong in asking for instructions before, for the fourth time, he enters upon his task.
>
> This is the more necessary because his last year's report was unsatisfactory to many. The report of the Newcastle meeting was objected to because it referred almost exclusively to the exhibition of implements and to the discussions led by Professor JOHNSTON and Mr. PARKES, and added but little on the show of cattle to the mere premium list, naming those animals which in the opinion of the Society's Judges were the best in the yard. And we have no hesitation in still adhering to our opinion that the *fullest report of the show of live-stock would be of less value to the reader than one of the various implements exhibited, and of the agricultural discussions conducted.* In fact, we have never yet seen a useful report of a Cattle-Show, and should be very glad if some of our readers, before the July meeting, would discuss the question, What points should such a report refer to? What particulars are worthy of a permanent record? To what would allusion be most useful in the case of readers who had not an opportunity of being present?

For ourselves, those who are personally interested may think we should report all the details—who got the premium, first, second and third, for cows and calves, pigs and poultry; and this might be well enough, if this journal were of local character and circulation; but as its circulation is equally spread over the Union, is it not clear that the space which would be thus filled by details personal and local, may be occupied with matter more generally useful and interesting? Such is the impression under which we act—otherwise nothing would be easier than to cover several pages with lists of premiums. We prefer, however, to give general observations, independent and important, on the general aspect and spirit of such exhibitions. Are we not right? What say you, readers? Where anything original and useful appears in the Reports of Committees, we shall endeavor to give it. There ought to be in such cases a Committee appointed to make a *general report on the exhibition as a whole*, whose duty it should be to say *frankly* and on full consideration, in what departments, as shown in such exhibition, the Agriculture of the State appears to be *improving, retrograding, or stationary*—a sort of *resumé* of the whole. As for the "discussions" referred to by the London Editor, we have none at our Fairs; they don't wind up, in New-York, as in Massachusetts, with a dinner, appropriate

toasts, lively speeches, friendly *carte and tierce*, flashing allusions and sparkling repartee, "the feast of reason and the flow of soul"—such as we used to have at the old Fairs of the Agricultural Society in Maryland, and the brilliant meetings at the Central Course, under the Presidency of Judge HEATH, in the time of that bland, courteous and accomplished gentleman, J. M. SELDEN, in adversity as in prosperity—in look, in feeling, in action—always *the gentleman!* It was in him by nature; it came to him by education; and we rejoice to have a spot on which to hang this portrait of him, poor as it is, and short of doing justice to the original.

CATTLE OF IMPROVED BREEDS.

UNACCOUNTABLE APATHY IN REGARD TO THEM.

FEW things are more remarkable in the agricultural economy of our country than the neglect of cattle-breeders to avail themselves of the use of improved animals, descending from imported stock. Is it ignorance, or is it downright stinginess—that "penny wise, pound foolish" policy which often leads otherwise sensible men *to lose money by saving it?* Nothing was more observable in our late rambles in the mountains of Virginia than the failure of those who breed their own cattle to provide themselves with bulls that would soon give them a race yielding as much beef in three years as they now get in five. Yet so it is, that so lukewarm are cattle-breeders generally that no importer of choice stock can hope for remuneration. The premium bull Marius, at Saratoga, is said to have cost $700 on the wharf in New-York. He was imported from the stock of the late Earl Spencer, one of the wealthiest farmers in all England, and particularly distinguished as a zealous and enlightened Short-Horn breeder. We doubt not that 'Marius' would this day, at a National Fair in England, bring 150 guineas. What they will bring here is attested by the sales of Mr. Prentice and Mr. Gowen, and by the abortion of Mr. Sherwood's attempt to sell. Yet, for any part of our country well adapted to raising and fattening beef-cattle, the get of such bulls as Marius would doubtless give as much beef of the best quality in three years as our best native cattle would in five.

At a late meeting of the YORKSHIRE AGRICULTURAL SOCIETY in England, Mr. John Outhwaite was called on at dinner to give the health of the *successful competitors in the cattle department.* Whereupon he rose and said he

"had pleasure in rising to discharge the duty devolved on him, because he considered that the country at large was greatly indebted to that body of gentlemen he was about to introduce to their notice. And, as a tenant-farmer, he felt that he and those similarly situated ought to hail this toast, for he could assure them that this Society, which had been the means of bringing those gentlemen so prominently before the public as breeders of stock, had also been the medium of great advantage to him as an individual, and he doubted not also to other members of the company then assembled. A few years ago the meeting of this Society was held at Northallerton, and on that occasion two animals (twins) bred by Mr. Lax, of Ravensworth, were exhibited. One of them obtained the first and the other the second prize; and being struck with the perfection of their breed, he and two other tenant-farmers were induced to hire the use of them, and he meant to tell them, as the result, that while they may not be able to beat Mr. Lax, Mr. Booth, or Mr. Bates, still they had improved their stock so greatly by the introduction of those animals upon their farms, that, so far as he was concerned, whereas his father used to hold his bullocks until they were rising four years old, he never kept his more than two years. And farther, before they attained the age of two years and six months, they generally averaged sixty stones each, [840 pounds,] and that too without any food beyond the pro-

duce of his own farm—turnips and straw, with perhaps a little bean meal to finish them off in the spring. He believed that the reason why there were not so many cattle exhibited at these meetings as might be expected was that gentlemen were afraid of coming into competition with those individuals who had been so successful upon this and upon other occasions; but although he and others could not boast of being able to compete with them, they could boast and congratulate each other upon the fact that through the improvement which had taken place in the breed of cattle, they could now bring their stock to maturity at an earlier period than they formerly could."

"Mr. Bates, of Kirkleavington, responded, and in the course of his remarks he noticed the history of the breeding of the Short-Horns, and stated that the first Agricultural Society was established in this country in 1732."

We cannot let the occasion pass without noticing the fact that the British agricultural annals fully evince that Mr. VAIL, of Troy, the zealous President of the State Agricultural Society, has gone to one of the most distinguished and successful breeders of Short-Horns in England for his imported stock of that blood. His cows at Auburn and at Saratoga, which bore off the first premiums, were both imported from Mr. Bates, of Kirkleavington, Yarmouth. At the meeting referred to, 150 *sat down to dinner*, and speeches were delivered by Lord Feversham, E. S. Cayley, Sir J. V. B. Johnston, the Earl of Harewood, Lord Morpeth, and others.

Besides their visible and intrinsic excellence, it is saying much for Mr. Vail's cattle that the breeder, not only of his two prize cows, but, we believe, of most if not all that he has of imported stock, took at this great Show lately in Yorkshire—

First prize for the best bull of any age	$150	Second best cow of any age	$50
Second best yearling bull	50	Second best two-year old heifer	25
Best heifer calf	$50		

Looking back on what has occurred within our own experience and observation, we are sorry to add that the public spirit in the department of improving our cattle has not kept pace with a wider diffusion of agricultural knowledge.

We remember well that some twenty years since, the first three imported in Maryland—bull Champion and heifers Shepherdess and White Rose, sold instantaneously on coming on the ground, for $1,500, and that to a gentleman who, until he saw them, had maintained that England contained no better cattle than his own; and he afterward declared that he considered himself well remunerated for the whole outlay, for the use of the bull for one year on his own farms, of which, however, we believe, he had *fourteen!* and he got $500 for the first calf, Wye Comet, from White Rose.

This early importation into Maryland twenty-five years ago, was made by the present Editor of The Farmers' Library, (then Editor for more than four years of the American Farmer,) with no view but to let the country see what had been actually doing in the way of improving cattle in England, of which his information was derived from correspondence and English journals. He was glad to have them pass, without gain or loss, which he could have but ill afforded, into liberal hands like Governor Lloyd's, who would know how to esteem and cherish them. The following proceedings, which we may be excused for recording as an agreeable reminiscence, historical of the introduction of these splendid animals, will serve to show the light in which such efforts were then regarded by men who have not left behind them their superiors in discernment, liberality and public spirit. Ah! those were good old times, of which we shall call up some farther remembrances in honor of the men and for the good of the cause. *Mem.*—When these cattle sold thus off-hand readily for $1,500, cash, the reader may ask, Ah! but what was the price of produce? The answer is—

June, 1822—Flour	$6 50	Corn	75 cents	Tobacco, fine yellow, $25 to $35; spangled, $18
Wheat	1 40	Rye	68 "	to $25; fine red, $12 to $18; good, $6 to $12.

Extract from the Report of the Committee on Cattle.

The Committee, in concluding their Report, cannot omit to congratulate the Society on the opportunity afforded by the exertions of Mr. J. S. Skinner, of viewing the remarkably fine specimens of this kind of stock recently imported by him, and now exhibited—a young bull and two heifers of the English improved Short-Horned breed. These animals, (not yet two years old,) in the opinion of the Committee, can hardly be spoken of in terms too high, and are a real acquisition to the country. They were bred by Mr. Charles Champion, of Blythe, near Bawtry, in Nottinghamshire, England, and come direct from his hands to Mr. Skinner. They are of great size, fine forms, and combine the very estimable points of aptitude to fatten, and of deep milking; and last, though not the least, that remarkable quiet habit and good temper so much valued by the best breeders, which not only makes it convenient and safe to feed and milk, but which contributes much to the disposition to fatten, and to which, no doubt, may be attributed in a great measure the fine condition in which they now appear, although only little more than a week since they landed from on shipboard.

As in the opinion of the Committee, the Society are alike indebted to Mr. Skinner, for opening a correspondence on this interesting subject with Mr. Champion, a justly celebrated breeder in England, and to the latter gentleman for the entire justice he has done to the expectations of the importer, in the selection of the animals sent him, they beg leave to recommend this successful effort to improve the stock of our country to the special notice of the Society, in such a mode as they may deem best calculated to encourage similar introductions, and to reward the present enterprise.

There were shown also, by Mr. Skinner, a pair of animals of singular character, and heretofore unknown in this country, a bull and cow of the Tuscan breed, said to be fitted in an eminent degree for the yoke. They were selected in Tuscany, and brought to this country last year by Commodore Bainbridge and S. Hambleton, Esq., of the U. S. Navy. Actuated by the laudable desire of contributing to the introduction of useful animals, they ceded them to Mr. Skinner at the original cost, who in the same spirit has disposed of them to Mr. John Middleton, of South Carolina. The Committee will not undertake to determine how far it may prove advantageous in this country to give up in neat cattle the properties usually most sought for, to obtain a breed principally fitted for working-oxen, but for this qualification these animals promise much, particularly as to the Southern States. It is fortunate that they have become the property of a gentleman in that quarter in whose hands the Society may be confident the experiment will be fairly made.

J. MASON,
JOHN HARE POWELL,
I. CHAUNCEY,
JOHN BARNEY,
SAMUEL JACQUES, Jr.
Committee.

After the reading of this Report and the delivery of the premiums awarded by it, the following Resolution was offered by George Calvert, Esq., and unanimously adopted by the Society:

Resolved, That a Committee of three members of this Society be appointed by the President thereof, with authority to procure and present to J. S. Skinner, Esq., three pieces of plate, of the value, one of fifty dollars, and two of twenty-five dollars each, in token of the belief entertained by the Society, of the great improvement in the stock of neat cattle which must result from the importation by him of the bull Champion, and heifers White Rose and Shepherdess, bred by Charles Champion, Esq., of Blythe, near Bawtry, in Nottinghamshire, England.

And General Ridgely, of Hampton, Henry Thompson, Esq., and Doctor Allen Thomas were requested to perform this service in behalf of the Society.

The Resolution was carried out by the procurement of a pitcher of much higher cost, with an engraving of the bull on the front of it, and two beautiful waiters mounted on cow's feet.

OXFORDSHIRE OR IMPROVED COTSWOLD SHEEP.

MR. CLAYTON REYBOLD'S ANNUAL SALE.

The first and as yet the only notice we have seen of this first Annual Exhibition and Sale, we find in the Missouri Republican of Sept. 22.

We know of no hands in the country into which this large and, for certain uses and localities, valuable race of sheep—large in the carcass and proportionately large in the fleece—could have fallen, with greater certainty of being kept up to the mark, than in those of the Reybold family—father and sons—living in the same neighborhood in admirable harmony, with every guaranty for the preservation and improvement of their stock that ample and united means and judgment can confer.

Not doubting that they will adopt the precaution, hitherto too much neglected by American importers of foreign stock, of frequent importations to avoid the bad

effect of close breeding (especially where the chance of selection of breeders is very limited), we doubt not that their stock of sheep will maintain its superiority; and hope for them, what too rarely happens, that their zeal and outlay may be well encouraged and requited.

With some exceptions, the mischievous practice has been to import very superior animals, and then to go on breeding from all their progeny, good and bad, instead of rigidly rejecting all inferior females, and frequently introducing the best males from abroad. It is only by this system that imported stock of any kind can be kept from degenerating, and it is exactly by the neglect of this management that we have witnessed everywhere so much deterioration. Another question arises: Suppose a willingness to be thus cautious and particular—how many of our farmers have the judgment (the result both of zeal and experience) to select the best and to doom all defective animals to the knife? For he who has it at heart that a particular race of animals shall be maintained in their purity, and continue to be esteemed for their peculiar excellence, will refuse to sell as breeders, at any price, such animals as he may himself condemn as defective—because, sooner or later, the stock itself falling into general disrepute, the injury will come back upon himself. There are those—we won't, for we can't, say gentlemen—among farmers who think it a smart thing to put off an inferior animal on a stranger or a friend whom they find not skilled in the points that constitute a good one. Such men belong to and ought to be classed in the category of sharpers and horse-jockeys, who fabricate pedigrees and sell blind horses for sound ones.

At the late Fair at Saratoga we took two gentlemen, strangers, to look at two pens of fine Merino sheep, and asked the men in charge, in both cases, what was the average weight of fleece of the flock from which these sheep had been selected? Taking us, probably, either for the Judges on their rounds, or for very green ones, in both cases they said the average was not less than *seven pounds!* Now the sentiment excited was that of unmitigated disgust, and no purchase would have been made at any price from those who employ such very knowing shepherds or agents. On the other hand, without meaning any invidious comparisons beyond the cases stated, there was a worthy Scotchman, in charge of Mr. McIntire's sheep, who answered frankly and honestly to all questions as to his stock, without any mean attempt to disparage any others.

Gentlemen should be attentive to these things, for, trifling as they may seem, they have a bearing on the character of the profession, as well as a local bearing, about which no one can feel indifferent who is animated by that *esprit du corps* which should influence agriculturists as well as other classes.

But our business is with *Mr. Reybold's Annual Sales*—to express the hope and confidence that every precaution will be taken to maintain his flock at the highest mark of improvement, and that he will never allow a diseased or defective animal knowingly to pass from his own into the breeding flock of any one, even through the hands of the butcher—acting, in this respect, on the principle of a certain Maryland breeder of Devons, whom we will not name, but who would sooner give away the best than sell a degenerate and unworthy beast, as a breeder, for any price.

Mr. Clayton Reybold sold at his farm, near Delaware City, on the 1st of September, a lot of his superior Oxfordshire and Leicester sheep, at the following prices:

No. 1, $61—Maj. Peter, Montgomery County, Md.; No. 2, $44—Mr. Carroll, Baltimore; No. 3, $40—Mr. Gray, Philadelphia; No. 4, $43, and No. 5, $100—Mr. Griscom, New-Jersey; No. 6,

$10—Mr. Hickman, Pa.; No. 7, $43, and No. 8, $41—Mr. Boiling, Va.; No. 9, $45—Mr. Brown, Md.; No. 10, $41—Mr. Jessup, Baltimore; No. 11, $40—Mr. Peyton, Tenn.; and No. 12, $40—Mr. Hall, Sussex, Del.

Mr. REYBOLD was then called upon to put up some of his fine Leicester ewes, eight of which were sold to the following persons:

Lot No. 1, 2 ewes, $28 per head—Mr. Holt, N. C.; Lot No 2, 2 ewes, $14 per head—Maj. Peter, Md.; Lot No. 3, 2 ewes, $13 per head—Maj. Peter, Md.; Lot No. 4, 2 ewes, $11 per head—Mr. Jessup, Baltimore.

MODERN FACTS, OPINIONS AND PRACTICE.

DRAWN FROM EXPERIENCE; AS DETAILED IN THE BEST ACCOUNTS OF ENGLISH AND SCOTCH HUSBANDRY.

THE winter-feeding of horses in Scotland is hay and oats. The former is given *ad libitum;* in other parts of Scotland oat-straw is given instead of hay. Many judicious farmers think one as economical as the other; but that, with us, must depend on circumstances. There are thousands of farmers south of the Delaware who do not yet grow a pound of hay for winterage. Governor Gilmer of Georgia, yet lively, active and vigorous in mind and body, is the first person who regularly "made hay" in that State.

The raw oats in Scotland are usually *crushed;* and it is considered by experienced, *thinking* farmers, that four bushels of crushed oats will go as far as five uncrushed.

SOILING.—The advantages of soiling are thus forcibly stated in a few, and, in some respects, *new* words, worthy of being noted:

"In the Lothians, where, on almost every farm, some extent of bare fallow has to be tilled during the period intervening between the completion of turnip sowing and the commencement of harvest operations, the work-horses are now generally supplied with *green clover and rye-grass in the stables* or court-yards, which is decidedly a better practice than that of turning the animals afield to graze during the midday rest. When we consider the many advantages accruing from this practice, we feel rather astonished that it is still but partially adopted throughout the kingdom. It is not difficult to conceive the fatigue endured by horses, from being compelled after a forenoon's hard work, to undergo the additional labor necessary in a pasture field, and that probably a bare one too: to satisfy their hunger, not to speak of the annoyance to which they are at the same time subjected from a host of insects; the most troublesome of which are the *horse-fly or cleg*, and the *bot-fly;* whereas when supplied in a cool, airy stable or court-yard with clover and rye-grass or vetches, they soon and easily fill themselves, and having thus more time for rest, are fresh and vigorous for the remaining labors of the day.

"Another important advantage arising from the *soiling* of farm horses is that their excrements are thereby preserved, by which a very considerable addition is made to the quantity of home manufactured manure. The dung made in this way is also of the very best quality; the solid and liquid excrements of horses being quickly decomposed in the open air, their most valuable constituents are soon dissipated, and consequently the field droppings produce comparatively little benefit. This objection to grazing does not, however, apply with equal force to black cattle, their excrements being of a colder and less decomposable nature than those of horses; still the value of cattle droppings is greatly diminished by exposure to the sun and wind. But the soiling system is preferable to grazing, not only as affording the animals more time for rest and producing an increased quantity of excellent manure; it also effects a considerable saving of grass or green forage. It is admitted that the cutting and cartage of the forage required by a large number of horses necessarily occasions some labor, which would be avoided by grazing; but this is amply compensated by the improved condition of the horses, and the other advantages above referred as arising from soiling. When a sufficiency of litter is available on the farm, the work-horses may with much advantage be kept in the stables over night, in which cases the evening feed of oats may properly be withheld even though the animals be at hard labor. It has been found in practice that a statute acre of a fair crop of clover and rye-grass suffices for twenty horses during a period of fifteen days, each horse getting as much as he can consume over night and during the midday rest."

There is no doubt to be entertained that an extension of the soiling system will mark the farther progress of economical improvement in American husbandry. If circumstances would admit of its entire substitution for pasturing abroad, it

would be attended, too, with the inestimable advantage to be derived from dispensing with the awful cost of *keeping up cross-fences.*

EXPENSE OF MAINTAINING A WORK-HORSE.—Among the Scotch, as every one knows, a shrewd, calculating people—the opinion of the best judges is that to maintain a work-horse in proper condition, under ordinary farm labor, he will require each day about fifteen pounds, or two fifths of a bushel, of oats—(Scotch oats, in the general way, are estimated at thirty-eight pounds the bushel.) This, for eleven months' feeding, when actually at work, amounts to five thousand and ten pounds of grain, and as it requires, in the best cultivated part of Scotland, the whole labor of one horse for the *due* cultivation of about twenty-five Scotch acres, equal—let the reader note once for all—to thirty-one and a half statute acres, the horse will thus consume annually about two hundred pounds of grain, for every acre he works, in addition to grass, straw, &c.

Now suppose the case of a man in the South—at least six work-horses for a farm of three hundred acres; he would at this rate require seven hundred and fifty bushels of oats, or their equivalent in corn, in a year. The Yankee saves that by working oxen, which at last *go into his meat tub!*

THE IMPORTANCE OF CARBON.

In an interesting work recently published by Jasper W. Rogers, entitled "An Appeal for the Irish Peasantry," the value of carbon in the soil is clearly shown. "In proportion to its proper supply to the culture of all plants, either by the atmosphere or *otherwise*, depends the luxuriance and vigor of their growth."

"Sir Robert Kane gives the following highly valuable Table, showing the amount of carbon in each plant, which he names, viz.:

Wheat	per cent.	46·1	Carbon
Wheat-straw	"	48·4	"
Oats	"	50·7	"
Oat-straw	"	50·1	"
Potatoes	"	44·0	"
Turnips	"	42·9	"
Red-clover hay	"	47·4	"

This, in itself, is sufficient to prove the indispensability of carbon to vegetation.

"It is an absorbent of the highest order, and, used as a fertilizer, it yields to the *roots* of the plant carbon in its purest state, in such quantum as Nature demands."

And if it absorbs moisture, it must also absorb the carbonic acid and ammonia that rain brings with it. There are many other important facts stated in the same work, which should be read by every farmer. And the question is, whether a sufficient quantity is, in all cases, *supplied to the soil*, and that in the most available state for the benefit of the growing plant?

THE BEST TIME AND METHOD OF SOWING BARLEY.—The barley crop of England is one of immense importance, and is so regarded in the United States, (our crop being 4,161,504 bushels.)

The following will be deemed worthy of attention. The subject has the more interest for us as it seems probable that its culture will be extended to parts of the country where it has not been hitherto cultivated. It was that consideration which prompted us to seek from H. S. Randall, Esq., his valuable Essay, published in the last volume of this journal; and which induces us to give the following opinions, elicited in the course of a recent discussion in an English Farmers' Club.

We may here remark that in July last we witnessed the harvesting of the wheat crop at Montpelier, in Rappahannock County, Virginia; and recollecting the old practice in Maryland, forty years ago, we were very much surprised, after all we had published in the old 'American Farmer' in favor of the practice, to see how very immature a large portion of the crop seemed to be, when cut; but on inquiry of Doctor Thornton, his philosophy seemed to be incontestible, and fully warranted his practice. The reasoning and the application were these: He said, if you cut off your corn just above the ground, when

well glazed, and before it has got *hard and perfectly ripe*, and stook it immediately, the sap will go on to elaborate and perfect its office on the grain, as though the stalk were left standing: and so with wheat—whereas, if you leave either, spread out as it falls, exposed to sun and weather, the whole will immediately *wither*, and the immature grains will shrivel. Hence his people followed *close on the heels* of the scythe-men, to pick up and bind, and shock the wheat immediately. As to wheat, the object is, first to keep it from *shattering*, as it does badly, if left to get dead ripe; and besides, it is agreed by millers that wheat thus early cut makes much better flour. As to Indian corn, the object in early cutting off, is the better to sow down the ground in fall grain. None know until they try, how apparently green grain may be cut if quickly gathered up and otherwise properly cared for.

There is said to be an old saying in Scotland, that "Barley will ripen nine days in the stook."

July 10.—In the absence of Mr. Green, who was to have introduced the subject for the evening's discussion—"On the best time and method of cutting and securing the barley crop," Mr. Hislop volunteered to supply his place, by stating, in the first place, that in his opinion barley, like wheat, ought to be cut before it is fully ripe, not adhering to the old maxim that it ought to be forgotten for a week or ten days after it appears to be ripe. Maltsters certainly differ in their opinion on this head, some saying that when it is reaped before being ripe the malt is apt to be flinty, while others maintain that the barley in that case germinates more freely, and if managed with judgment, produces a superior malt. Mr. Hislop stated that at any rate, according to his experience, the early reaped barley, that is, that which is cut before being *dead* ripe, commands a better price in the market, which he considered a sure criterion of its superiority. The mode of cutting which he recommended was with the scythe provided with a piece of thin board ten inches in hight at the heel of the blade instead of a bow of wood or iron; that the barley should be taken up immediately on being cut, and made up into sheaves of sizes varying according to circumstances; that is, if the weather was unpropitious, or if there should be much young clover on the ground, into small sheaves, and into larger if the weather should be warm and dry, and little or no clover; though as a general rule he should prefer small sheaves. He particularly condemned the practice of allowing the barley to remain in the swath, after being cut, even if overtaken with rain. He then said that in setting up, he generally placed five sheaves, if small, or four, if large, on each side, and hooded them with two others. The plan of hooding he particularly recommended, as he maintained it preserved the color of the barley, and rendered the sample more pleasing to the eye. The stooks, he said, should be set up with the ends north and south. Mr. Bayldon, speaking as a maltster, said that he always prefers a bright color in barley. To attain this he recommended that it should be taken up into sheaves and set up into stooks immediately on its being cut, even if the weather should be wet; and stated that he found by experience that the barley which had been so treated, compared with other barley, cut on the same day, which had been allowed to remain in the swath, the former was much easier to malt, and was superior in quality when malted. The system of hooding the stooks he much recommended. With regard to the most advisable time of reaping barley, he should say that in variable weather, let it be cut before being fully ripe; but if the weather should be hot and settled, he thought it better to allow it to remain until it was ripe, but not beyond. He farther observed that a little sweating in the stack he considered to be desirable, as it made the barley germinate better and malt more freely.—Mr. John Wood said he had tried hooding the stocks, and most emphatically recommended the plan, particularly in a wet season. He also said that in his opinion the barley should be taken up immediately on its being cut, and not on any account to lie in the swath. He also recommended that the stooks should not be moved or touched until led away, even in bad weather.—Mr. Charlesworth said he approved of early cutting and of hooding the stooks, and remarked that in his opinion there is more barley spoiled by being allowed to stand too long, than by being cut too early.—Mr. T. Wordsworth expressed the same opinion.—Mr. Hislop here again observed that in Scotland there is an old saying that "barley will ripen nine days in the stook."—Mr. W. Belton gave an instance where in a field of barley, with a thick undergrowth of clover, the part which was taken up immediately produced an excellent sample, and in that part where the barley was allowed to remain in the swath the sample was not nearly so good.—With regard to early cutting, Mr. Briggs remarked that in all sorts of grain, when cut on the verge of being ripe, the skin is thinner and finer than when allowed to remain until dead ripe, and that in the latter case the woody fibre at the exterior of the grain increases, at

the expense of the kernel within. This he considered a provision of Nature, to enable the grain to bear the inclemency of the winter, and to preserve the powers of vegetation from being thereby injured; but at the same time he conceived that that very thickening of the skin might in some degree impair its tendency quickly to vegetate, and that therefore barley reaped just before being ripe, and allowed to complete the ripening process in the sheaf, might reasonably be expected to germinate more speedily, and produce a better malt.

At the conclusion of the discussion, the following Resolution was passed: "That in the opinion of this meeting it is preferable to cut barley before it becomes dead ripe, *particularly in unsettled weather;* to bind in small sheaves *immediately* on its being cut, and set up in stooks, with hoods; also that the raking should not be mixed with the general crop."

THE USE OF BEANS IN FEEDING HORSES.—Americans, prone to experience and change in laws and constitutions, in pursuits and in places of living, are yet a people of routine as to agricultural practice. For instance—while in other countries so many things are used as food for horses and other animals, we go on forever, and without calculation, using the same three or four kinds of diet, no matter what may be their price. We seem to suppose that horses can only be fed on *grass, hay, straw, oats, corn, and chopped rye.* Now in Europe, they feed on *carrots, potatoes, pumpkins, apples, turnips, flax-seed, oil-cake, and not a little on beans and peas.* How many American farmers have ever taken the trouble to ascertain the comparative value of beans and oats; for example: How do they know but in many cases, they might have bean or pea crops, that would give *more nutriment* for a given cost, and therefore the more economical food? But, alas! to examine such questions it requires the *labor of thought!* and that, to some people, is dreadful to *think of!* To those who do accustom themselves to reflect and inquire, the following suggestions, founded on facts and experience, may appear interesting, and may lead, not only to thinking, but to practical experiments and results, on that very interesting subject of inquiry, *the cost of feeding farm-stock;* in which, (especially when we consider how extensively mules and oxen might take the place of horses,) millions of dollars are wasted in the United States:

August 13.—Mr. Briggs introduced the subject for the evening's discussion—"On the most economical mode of keeping Cart-Horses," by remarking that according to chemical theory (and he believed it would be found correct in practice also) different descriptions of food, both for men and the inferior animals, are nutritive in proportion as, on analysis, they contain nitrogen—that being one of the main ingredients of gluten, which is universally acknowledged to be the most nutritive part of all food; and that the intrinsic value of any kind of food, for the production of muscle and strength, must therefore depend upon the quantum of that constituent (nitrogen) which it possesses. From chemical analysis it is found that the quantity of nitrogen contained in the different articles of food suitable for horses is extremely variable; hence their relative value must also vary in a like proportion. But in the market that criterion is not the regulator of price, and, therefore, by a judicious selection of food Mr. Briggs maintained that much saving might be effected in the cost of keeping horses. He then quoted a Table extracted from M. Boussingault's work on "Rural Economy," in which is given the relative value in nutriment of a great variety of articles of food, taking 100 lbs. of good meadow hay as the standard or basis of calculation; from which it appeared that it required, on the average, 350 lbs. of wheat straw, or 63 lbs. of oats, or 23 lbs. of beans, to yield the same quantum of nutriment as 100 lbs. of hay. A very common allowance for a farming-horse he stated to be, per day, 20 lbs. of hay and 1½ pecks of oats, costing per week—

	s.	*d.*
140 lbs of hay at 70s. per ton	4	4
10½ pecks of oats at 2¼ stone (or 136 lbs.) per quarter, say 8 stones at 1s. (equal in value in nutriment to 164 lbs. of hay)	8	0
Per week	12	4

Now, suppose a horse were allowed one bushel of beans, or 63 lbs. of bean meal, per week, it would, according to the Table, be equal in strength of nutriment to about 274 lbs. of hay; and as he calculated that the above method of feeding (with hay and oats,) was equivalent to 304 lbs. of hay alone, an addition of only 30 lbs. of hay, or its equivalent, appeared to be necessary, when 63 lbs. of beans were substituted for eight stones or 112 lbs. of oats. But then again, an animal cannot subsist on condensed food alone, but requires also bulk, not only properly to distend the stomach, but of such a nature as to yield the elements of

carbon consumed during the process of respiration, particularly when that respiration is quickened by continual effort while at work. In order to give that required bulk at the least cost, Mr. Briggs proposed to substitute chopped straw, of which he conceived 25 lbs. per day or 175 lbs. per week would be amply sufficient, which would yield nutriment equal to 50 lbs. of hay. In order to neutralize or counteract the binding nature of beans as food, Mr. B. recommended the addition of 1 lb. per day of crushed linseed; and to show the relative cost of these two methods of feeding horses, he exhibited the following calculation:

	s. d.	s. d.	Equivalent in hay only. lbs.	Equivalent in hay. lbs. per wk.
1. Hay per week, 140 lbs. at 70s. per ton	4 4		140	
Oats per week, 10½ pks. or 8 stones at 1s	8 0	12 4	164	304
2. Beans per week, 1 bush. or 63 lbs. at 40s. per qr.	5 0		274	
Straw (chopped) per week, 175 lbs. at 30s. per ton	2 4		50	
Linseed per week, 7 lbs. at 1¼d.	0 9		31	355
Cost of grinding beans, linseed, and chopping straw	1 0			
	9 1			

From which it appeared that the latter method would cost less by 3s. 3d. per week, per horse, and would be more nutritive by the equivalent of 51 lbs. of hay per week.

He farther stated that during the present summer he had tried the experiment of chopping green Italian rye-grass along with chopped straw and bean meal, which, when used soon after being mixed, to prevent fermentation, answered remarkably well, and at little cost. The mixture and cost he stated to be as follows:

	s. d.	Equivalent in hay.
Bean meal per week (8 lbs. per day) 56 lbs. at 40s. per qr	4 6	243
Straw (chopped) per week (15 lbs. per day,) 105 lbs. at 30s. per ton	1 5	30
Green Italian rye-grass per week (25 lbs. per day), 175 lbs. at 10s. per ton.	0 9½	35
Grinding and chopping, as before	1 0	
	7 8½	308

Being equal in nutriment, theoretically, to the first mentioned mode of feeding, and a little more than one-half the cost. The making use of straw as food he considered as far superior and more economical than converting it into manure by merely being trodden in the folds; and chopping the rye-grass he stated to be also a great saving, from much less waste being incurred. He concluded by stating that if the theory of the relative value of oats and beans, in proportion to the quantity of nitrogen that each contains, be correct, the latter (beans,) must be worth nearly three times as much, weight for weight, in the production of muscle (not fat) as the former (oats), and strongly recommended the members present to give beans to their horses; though to fattening cattle or pigs, he recommended a mixture of the two, in the proportion of two thirds oats to one third beans, the one to produce fat, and the other *muscle* or *lean meat*.

The subsequent Resolution was to the effect that "cart-horses may be kept economically, and in good condition, upon good chopped straw, mixed with about 9 lbs. of bean meal, and 1 lb. of crushed linseed per day."

To the preceding observations, the following may be appropriately added:

In recommending an article for food, it is common to inquire what are its nutritive qualities? According to Einhof, the proportion of nutritive matter in beans, compared with grain, is as follows:

Wheat	74 per cent.,	about	47 lbs.
Rye	70 "	"	39 "
Barley	65 "	"	33 "
Oats	58 "	"	23 "
Beans	68 "	"	45 "
Peas	75 "	"	49 "
French Beans	84 "	"	54 "

The 84 per cent., nutritive matter of French beans, as above, is made up of pure farina 50, and gluten and mucilage 34 parts; they are, therefore, according to Rham's remark, "superior to every other grain or pulse cultivated, in point of nourishment; and when it is taken into the account that they remain in the ground only from May to September, and that a crop of cabbages or turnips is growing in the intervals at the same time, it will appear that the cultivation of this pulse on a large scale might add greatly to the resources of Agriculture."

There are accounts of the *Windsor Bean*, in England, yielding 11 quarters or 88 bushels to the acre.

A Hint for Directors of Agricultural Societies.—At a meeting of the Royal Agricultural Society of England,

Colonel Challoner gave notice that at the next monthly meeting he should move that it be an instruction from the Council to the Stewards and Judges of the Implement Department, that the following points of information should be ascertained from the respective makers or exhibitors of implements and machines selected for trial, previously to the other arrangements being made for the determination of the respective capabilities and practical value of such implements and machinery, at any particular Country Meeting of the Society, namely:

1. The number of revolutions per minute at

which all hand-instruments are respectively constructed to be worked.

2. The speed per hour at which horses are to walk, and the power they are required to exert, in the case of all implements and machinery intended to be worked by such means.

3. The weight per inch of pressure which all engines or apparatus for steam power are made to bear.

Colonel Challoner explained that his object in this motion is to obtain, for the guidance of the Stewards and Judges of implements, such data as will enable them to place the implements, machines, or engines selected by them for trial, under the special conditions that will best accord with the design of the inventors or improvers of such mechanical arrangements, and especially to limit their operation to that degree of power for which they were respectively constructed.

To some of our readers it may be acceptable to know the COMPARATIVE PRICES of feeding materials for men and beasts, and for the land in England in April, 1846, and April, 1847. It will be seen that Guano keeps up, and that the Peruvian is $10 per ton higher than the Ichaboe.

Lentils, as a new article, are coming into favor as a comparatively cheap and nutritious food for dairy cows.

In Guano, a good deal has been done at last month's rates. Ichaboe of good quality has become very scarce in the large seaports, which is causing Peruvian to be more looked after.

For top-dressing hay and pasture lands, Peruvian has been found, in all trials here, to be infinitely superior to Ichaboe.

DESCRIPTION.	Price in 1846, per ton.		Price in 1847, per ton.		RISE.	
	£	s.	£	s.	£	s.
Oil-Cake	10	10	13	0	2	10
Oil-Cake Meal	10	10	13	0	2	10
Egyptian Beans	8	16	11	4	2	8
Egyptian Bean Meal	9	4	12	8	3	4
Indian Corn	9	4	13	0	3	16
Oatmeal	16	16	24	0	7	4
Lentils			11	0		
Lentil Meal			12	0		
English Beans			14	4		
Dutch Beans			13	16		
Peruvian Guano	10	15	10	15		
Ichaboe Guano	8	15	8	15		
Barrel Flour, per 196 lbs.	1	14	2	0		6
Indian Meal, per 196 lbs.			1	10		

SALT.

IS IT NECESSARY OR USEFUL TO GIVE IT IN THE FOOD OF CATTLE?

A SERIES of experiments, carefully conducted by M. Boussingault, go to show that it is entirely unnecessary, as it is found, on analysis of hay and other food, that Nature herself supplies what is needful. Liebig is of opinion that an excess of salt is injurious to the digestive organs of herbivorous animals. Still we must suppose, from the universality of the practice, that it is necessary and wholesome for cattle *grazing* in fields. This is indicated by the habit of wild animals having recourse to *salt licks;* and all have observed the eagerness of sheep and cattle when called to partake of the salt which is spread for them.

Old negroes, in such cases, are not the worst sources to go to for information; and we recollect inquiring this summer of the herdsman (we are sorry to forget his name) who salts and meals the cattle on the noble domain of that hospitable shoot of a good Irish stock, ANDREW BEIRNE (son of Col. Andrew Beirne, of Monroe Co.), and he promptly replied, "O yes, Master! very good—it makes 'em shed their coat, and keeps the body open."

The experiments referred to are minutely laid down in the September No. of the English Agricultural Magazine.

AGRICULTURAL SURVEYS.

NOTE FROM THE SECRETARY OF THE N. Y. STATE AGRICULTURAL SOCIETY.

It was not until since the New-York State Fair, that the following reached our hands. We beg the writer, unaffectedly, to believe that every sentiment of kindness and every disposition for the interchange of kind offices expressed in it, are cordially and fully reciprocated on our part.

We are delighted to hear of the proposed Agricultural Survey of Washington and other Counties, and that it has been committed to such competent hands.—We heard, too, with pleasure, some indistinct intimation that, as connected with the particular Survey designated, we are likely to have a thorough analysis of *Indian Corn*, in all its parts and periods of growth, to be made by one so adequate to the work and so zealous in the general cause as is the learned Doctor Emmons. When such really useful investigations are thus entered upon, the public will have confidence in the results, and will cheerfully support the Institutions by which they are directed, since they cannot fail to result in (what alone constitutes usefulness in almost everything) valuable additions to the existing stock of knowledge. We have no hesitation in believing that an Agricultural Survey of a single County, well conducted—as we are sure this will be—and embracing everything connected with that branch of industry, will be of more real and lasting benefit than all the State Exhibitions which have been held since the foundation of the Society. We could wish the Society had taken measures to have ascertained the proportion which the fodder of corn bears to the *grain*. We are aware that much depends on the kind of corn and something on the season, but still approximations might be had, highly useful as a matter of agricultural economics.

In regard to the extraordinary and, doubtless, well authenticated crops mentioned in this note, we may be allowed to say that if, along with these accounts, the Society had possessed the means to have analyzed the *soils on which they grew*, and of giving, along with that analysis, the *chemical composition of each of the crops* (which has been ascertained as to wheat and oats, at least), showing how much of their nourishment they derived from the soil—how much from the manure applied to it, and how much from the atmosphere—presenting the whole sum of information at one view—it would have contributed more toward the general production, or approximation to the production, of such crops throughout the State, than all the premiums they distributed for animals at the last Fair. It is by such investigations, and such diffusion of a knowledge of the elements of crops, and the principles on which their successful culture depends, that Agriculture has made such vast strides of late years in Europe, and especially in England, where the average increase in the last quarter of a century has been nearly equal to the total average product per acre in New-York—where there is reason to doubt whether the average *increase* has been one grain!

In relation to the "Transactions of the New-York State Agricultural Society," we have to acknowledge the receipt of the copy referred to, and will take the first leisure moment to examine and review it, with the candor and free-

dom which such performances authorize and invite, and at the same time with all the respect which is due to those under whose direction they are published. In the mean time, as a matter of agricultural history, and of information to which the public is entitled, we would feel obliged to the unfailing politeness of the Secretary to state—the Act of Assembly which authorizes the publication of these Transactions of the State Society—Does it specify the number to be published, and the disposition to be made of them? or leave both to the discretion of whom? Are they to be made up *bona fide* of the "Transactions" of the Society, or may they be composed of any matter, at the discretion of the compilers? and under whose particular direction was the matter designated of which the last volume was composed? What was the whole number published? at what cost per volume? and how have they been disposed of? To these inquiries, connected with a public expenditure for agricultural purposes, it is hoped there can be no objection—while it is due to frankness to state explicitly that so little of public patronage is bestowed on a branch of industry which supports all others, as the tree on which it grows supports the mistletoe, that we feel a jealous anxiety that that little shall be so expended as to achieve the greatest possible augmentation of the agricultural capabilities of the State. This feeling of anxiety has been demonstrated by the labors of not a short lifetime; and being altogether, thank Heaven! unconnected with and far above all alloy of pecuniary or self interest, will not be deemed out of place on this occasion. We should be glad, also, if the Secretary would have the kindness to specify the number of each of the books and publications distributed as premiums by the State Society and the County Societies, designating each work by its title and the cost per copy; and that when foreign editions have been given, the fact and their cost per copy may be stated. It is deemed best and most respectful to make these requests public, as the results are designed for public information, and exclusively for their bearing on the cause and interests of Agriculture. We have no doubt of the liberal interpretation of our views of the excellent Secretary of the Society, and of his cooperation, as far as respects the communication of facts to be ascertained by reference to the archives of the Society.

Before closing this hasty but grateful acknowledgment of the kind offer to furnish us with any information, and the invitation to communicate freely in relation to any matters on which we may desire to be informed, we will take the occasion here at once to say that, according to our humble judgment, the measure which, as we see in this volume of the Transactions, admits the *Ex-Presidents of the Society, ex officio, as acting members of the Executive Committee*, to whom is intrusted the whole administration of the policy, funds and affairs of the Society, *is decidedly wrong and unjustifiable.* It might be well to give them honorary seats and privileges on public occasions, but for an equal participation of government, and control of the proceedings of the Society, is to accumulate power in perpetuity in the same hands, contrary to the spirit in which all our institutions are organized and conducted. We shall, however, maintain our views on this, as on all other questions, most respectfully toward all who differ with us—pitying the narrow-mindedness of all, if any, who can find in an honest and independent difference of opinion, matter for personal umbrage or ill will.

All measures conceived in a high and proper public spirit, as those of this Society, may be presumed to court rather than shun close and respectful criticism. The Secretary of such institutions should be carefully selected and retained, but the direction should be in a certain proportion changed every year,

so as to bring in fresh infusions of spirit and judgment, keeping pace with the progress of improvement, and leaving no opportunity for the formation of cliques or combinations such as might naturally be expected to result from having men appoint their own successors, with power to "hold over" in everything but the name of being President. We speak of the principle, not of the men—*principia non homines*—but it would be in principle just as reasonable to have other Presidents or chief executive officers sitting in council for life. Instead of being members of the Executive Committee, *ex officio*, they should be rendered expressly ineligible.

J. S. SKINNER, Esq. AGRICULTURAL ROOMS, ALBANY, June 10, 1847.

Dear Sir—I send you by to-day's mail the "Albany Evening Journal," which contains a notice of a proposed Survey of Washington County, under the direction of the New-York State Agricultural Society. We are desirous of making progress, and if we can obtain thorough and minute Agricultural Surveys of the several Counties in the State, we shall ascertain the defects of farming—the means necessary to revive and improve the condition of the farmer, and to increase our crops, and adapt them also to soils and locations most congenial.—Dr. ASA FITCH, who has been selected to perform the Survey, is every way well calculated to do the work thoroughly, and I hope much good will result from it.

I have just seen your June No. of the Library, and thank you for the notice of our Premium List, &c. We are ever glad to receive suggestions as to its improvement—our only desire being to make it as perfect as we can, and as liberal as our means will justify.

You make some inquiries, under the head of "Scraps," as to crops reported at a meeting of the Executive Committee of the N. Y. State Agricultural Society. In relation to some of those, the entire crop was shelled and measured after being in a merchantable condition. In the Transactions, which I forward you to-day by express, you will find the statements and proofs as referred to below, viz.:

Charles W. Eels, Kirkland, Oneida Co.—123¼ bushels corn per acre. Vide proofs page 162.

This was a crop raised without any extraordinary application of manure.

Wheat.—Daniel Short, Richmond, Ontario Co.—See statement, p. 593. 178 bushels, 3 pecks, by actual measurement, on 3 1-160 acres of land: 60 bushels per acre, by weight.

The cultivation in ordinary manner.

Oats.—Wm. C. Burrett.—102 bushels per acre, by weight.

The statement accompanying this was duly verified by affidavit and witnesses, as to measurement, land, harvesting, and threshing and measuring crop—grain from entire piece, &c.

Our Societies are requiring, more generally than formerly, the measurement of the entire crop, which is the only true test of the actual yield.

You inquire as to Committees on Agriculture in our Legislature. The Committee in the House of Assembly made a Report on the subject of Agricultural Education, which is published in our Transactions. The Committee in the Senate did not make any Report on the subject of Agriculture. I give you the names of the Committees:

In the Senate—J. B. SMITH, Long Island; J. P. BEEKMAN, Columbia; C. EMMONS, Erie.
In the Assembly—A. BECKWITH, Herkimer; S. LAWRENCE, Tompkins; A. G. VANDERBILT, Dutchess; J. MCGONEGAL, Monroe; WM. TEMPLE, Otsego.

It will give me great pleasure to furnish you with any information which I can give from this quarter, and I hope you will freely communicate with me in relation to any matters you desire information upon here.

I am, respectfully, yours,
BENJ. P. JOHNSON, Secretary N. Y. S. Ag. Soc.

☞ The character of those who are truly wise, when contrasted with the assuming air of the ignorant, may be compared to the different appearances of wheat, which, while its ear is empty, holds up its head proudly; but as soon as it is filled with grain bends modestly down and retires from observation.

GRAIN AND FLOUR TRADE OF THE U. STATES.

THE following Table will show the export of bread-stuffs from the United States to Great Britain and Ireland for the year ending Sept. 1, 1847:

From	Flour, bbls.	Corn Meal, bbls.	Wheat, bush.	Corn, bush.
New-York	1,673,582	354,127	2,505,756	6,818,263
Philadelphia	320,950	244,604	539,633	1,127,125
Baltimore	304,263	82,926	101,376	1,687,896
Norfolk	49,687	21,289		1,362,761
New-Orleans	671,335	71,175	818,770	5,186,330
Boston	80,933	25,646	11,541	574,404
Other ports	49,939	47,513	38,058	541,965
Total	3,150,689	847,280	4,015,134	17,298,714

In addition to which, 88,261 bushels of rye, 436,881 of oats, and 289,613 of barley, were exported.

The exports from the city of New-York alone to Great Britain, Ireland, France, and all foreign ports, for the year, were as follows:

	To Great Britain, &c.	France.	All Foreign Ports.
Flour	bbls 1,673,582	243,433	2,154,161
Corn Meal	" 354,127	4,075	415,581
Wheat	bush 2,505,756	352,890	3,085,134
Corn	" 6,818,263	5,772	6,964,952
Rye	" 75,692	104,425	1,007,159
Oats	" 367,791	3,368	416,486
Barley	" 287,503	32	296,208

The following Table, showing the exports of corn, flour and wheat, by months, though differing somewhat in its aggregate from the official figures given above, is still near enough correct to be of interest in illustrating the course of trade during the year:

1846.	Corn, bushels.	Wheat Flour, bbls.	Rye Flour, bbls.	Wheat, bush.
September	117,949	87,195	505	151,765
October	195,182	163,967	953	222,380
November	367,350	115,161	489	303,121
December	245,791	232,894	970	276,758
1847.				
January	411,440	129,825	2,678	160,434
February	814,922	136,313	1,343	149,217
March	1,188,240	77,819	999	82,789
April	1,052,042	100,551	5,629	74,059
May	471,947	111,700	2,938	66,282
June	736,883	342,080	2,965	397,437
July	807,204	420,812	1,238	741,327
August	402,781	189,031	572	305,086
Total	6,811,731	2,107,348	21,279	2,930,655

The total receipts here by the Hudson River from the opening of navigation to the 14th of September last were 2,009,297 bbls. of wheat flour; 94,395 bbls. corn meal; 1,483,400 bushels of wheat; 2,843,841 bushels of corn; and 192,635 bushels of rye.

☞ GLASS MILK-PANS are coming more and more into use in Europe. Their advantages on the score of cleanliness must be obvious. It were to be wished that Societies or Institutes would appoint a Standing Committee and put aside a small portion of their ample funds, for the instant importation of sample articles invented abroad connected with agricultural and rural economy. True it is that, in general, this may be left to the vigilance and rivalry of tradesmen and manufacturers; but many years may elapse before we get the benefit of many things which might at once be profitably introduced. The same reason and policy that prompt the offer of premiums for useful things of home invention, would warrant the introduction of things which have been recently invented and patronized by Agricultural Societies abroad. Satisfied that glass milk-pans (on which the manufacturer should indicate the capacity of the vessel) would be a valuable acquisition to our dairy-women, we respectfully suggest the importation of a dozen, and the offer of a premium to the glass manufacturer who shall first produce them in this country, at a cost that will justify their being brought into general use. It has been seen in a very interesting and valuable Essay on "The Management of *Holstein Dairies*," published in The Farmers' Library, that there the dairy-women are allowed $1 a year for "*pan money*," and charged for all they break; yet they always "make by the operation." Let us have *glass milk-pans*.

LECTURES ON BOTANY.*

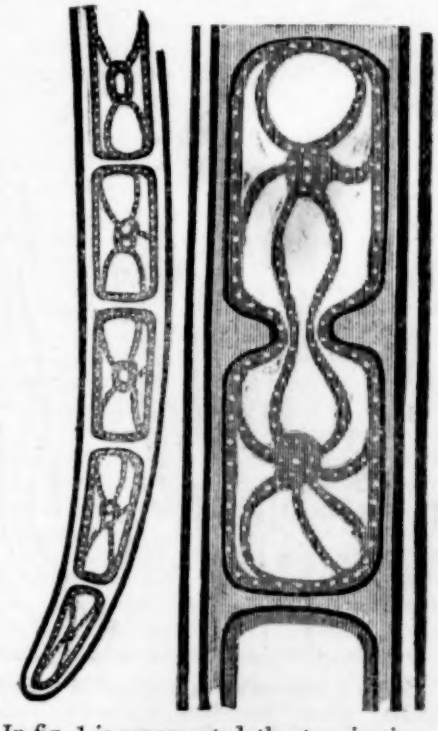
COURSE OF LECTURES ON BOTANY IN REFERENCE TO AGRICULTURE.

By CHARLES JOHNSON, Esq., *Professor of Botany at Guy's Hospital, &c. &c. At Messrs. Nesbits' Agricultural and Scientific Training School, Kennington Lane, Lambeth, near London.*

LECTURE III.

THE operations by which vegetable life and development or growth are maintained, however plausibly set forth by physiologists, and perhaps correctly so in the aggregate, are still, in our present state of knowledge, for the most part incapable of positive demonstration. Their combined effects are seen in the enlargement of parts previously formed and the production of new ones. The leaf opens from the bud, attains its destined size, changes its hue, and falls; the fruit ripens and discharges its seed; the seed grows into a plant, and the same processes are renewed from year to year; but the organs that minister to them are so minute, their mutual action so complicated, that although the external and grosser machinery of life is sufficiently evident, the springs that work it are involved in mystery. The microscope is too limited in its application to effect much toward the elucidation of the phenomena of life. The child breaks his toy to find out the source of the music which his act annihilates; and in like manner the philosopher tears up the organic tissue, or at best deranges its functions, that he may apply his glasses in the vain effort to detect the origin of that which is no longer there; still something is gained by both. The child has perhaps discovered a string that produces a sound when struck, and a little wheel with spokes that might have struck it; while the philosopher has discerned a few facts of which he was previously ignorant; and, in the end, each of them "garring odds and evens meet," and "laying that and that th'gither," find themselves a degree wiser than before. The important fact of the circulation of the blood was discovered and established by a similar series of deductions; and although its passage from the arteries into the veins would be, perhaps, vainly sought by inspection of the minute extremities of those of the higher animals, in the translucent tail of a stickle-back, or the membraneous foot of the frog, the diverging and returning currents are beautifully and obviously displayed. So in plants, although the movements of the sap and other juices cannot be traced in the woody tubes of the higher and more elaborately constructed orders, yet the microscope discovers in the cells of the minute and delicate hairs that grow from their surface, and in those of the leaves and stems of certain aquatic vegetables, comparatively very low in the scale of being, fluids in constant motion, which, with their accompanying phenomena, throw much light upon the process of increase in the tissue to which they belong.

Fig. 1.



In fig. 1 is represented the termination of one of the slender, hair-like aquatic plants, called "confervæ;" which consists of little transparent cells, more or less elongated, and joined end to end like a string of beads. In each of these cells the microscope discovers currents of fluid, containing minute particles, moving in the direction of the dotted lines, and apparently circulating from one extremity of the cell to the other, and returning on the opposite side. In the center, or sometimes toward one of the ends of the cell, is a small cluster of particles, from and toward which currents pass in a radiating manner, rendering the combined movements very complicated. The little central mass, however, evidently greatly influences the rotation of the

* Continued from page 121, vol. iii. Monthly Journal of Agriculture.

fluid, and the result is a gradual thickening of the membrane composing the wall of the cell, and likewise an eventual separation of the mass itself, either laterally or longitudinally, into two, each becoming a separate center of motion. The currents thus disturbed, the inner coat of the cell begins to contract between them, as exhibited in the left-hand figure, dividing it into two cavities, which are afterward more or less extended by the force of their respective currents.

Although no apparent connection exists between the cavities of the contiguous cells, careful and repeated observation shows that the movements of the fluids in each influence those of their neighbors, and that a reciprocal action is maintained throughout the whole living fabric. The uniformity of direction preserved by the currents in different cells is in accordance with this latter circumstance, and is beautifully exemplified in the stems and whorled branchlets of the "characeæ," another tribe of aquatic plants, a grade or two higher in the scale of vegetable organization than the "confervæ."

Fig. 2.

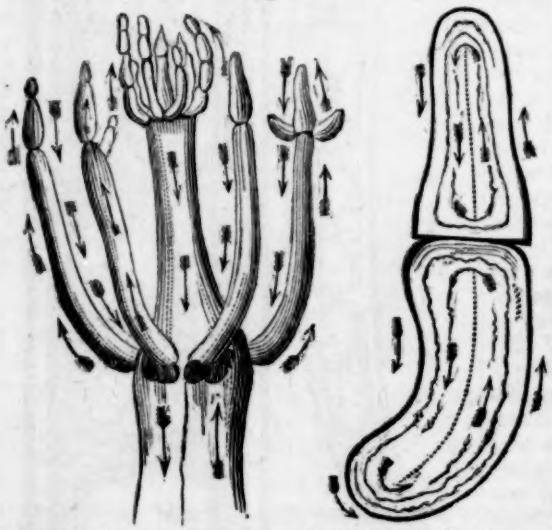


Figure 2 represents a portion of "nitella flexilis," greatly magnified, the arrows marking the course of the internal currents (more distinctly shown in the farther magnified view on the right) of the two terminating cells of one of the branchlets; from inspection of which it will be understood how a complete rotation of the fluid takes place in each cell, passing upward on one side and returning on the other, and that a similarity of movement obtains throughout each whorl of branchlets; the ascending current being toward the outside of the plant, the descending toward the inner or axial side of the whorl. These motions are more or less rapid, according to the season or the temperature under which the examination is made. In the winter time they are scarcely observable.

In what degree the flow of the sap in the higher orders may resemble these curious phenomena, we have not at present the means of ascertaining. The different condition of the woody tubes which contain and conduct it, as compared with that of the cells we have examined, may involve considerable diversity of organic action; and it would be absurd to endeavor to deduce any general conclusions from so very partial an acquaintance with a few isolated facts; the more important and ultimate phenomena of vegetable physiology are yet as much a mystery to human speculation as is the source of life itself.

The relative distribution of the minute elementary organs described in our last Lecture varies in different plants, and, as we shall see hereafter, occasions organic distinctions of high importance to the practical as well as to the merely theoretical student. But under whatever arrangement of the vital channels and recesses the existence and development of the vegetable are maintained, the general process is probably not very dissimilar between the highest and the lowest; the most complicated and the simplest of their structures being rather modified than changed for the required adaptation. The difference between the foodful and the poisonous, in all their degrees of quantity and intensity, are produced by causes which are only secondary or subsidiary to those that regulate the action of the main-springs of vegetable life. In all the higher orders of plants the absorption of nutriment by the root is but a small, however necessary, portion of a complicated process, involving a vast amount of vital and chemical action, whose conjoined effects are witnessed in the production of those secretions that give them character or property and value in the domestic economy of Man. The first elaboration of the absorbed nutriment changes it into *sap*—a fluid possessing nearly the same general characters in all plants, though unquestionably the medium from which their most diversified products are secreted by subsequent modification of its original component principles and (as it would appear in some instances at least) the addition of others. Leaving, however, these latter, and the sources of their derivation, to be discussed at a future period, we will now examine the structure through which the sap is conveyed, and the adaptation of the external organs traversed by its channels to the fulfillment of the changes which it is destined to undergo.

The popular notion respecting the functions of the root are very incorrect, it being generally regarded as the sole medium through which nourishment is conveyed to the plant; while, so far from such being the case, almost every other part presents more or less of an absorbing surface: not, perhaps, in constant or uniform action, but capable of so adapting itself under peculiar circumstances. Some plants, especially those of slow growth and succulent habit, will live

and increase for long and indefinite periods when deprived of root, and apart from the earth in which they naturally vegetate. A socotrine aloe has been suspended in a chamber of my dwelling-house for upward of seven years, and during that time has increased greatly in size, weight, and number of leaves; of which latter organs three or four are developed every year. It is still growing, and as healthy as one of the same kind planted in a pot and kept in a green-house, although its sole source of nutriment must be absorption from the surrounding air through the medium of its leaves. This is no isolated case, but one among many, of a plant growing without roots or perceptible cause of development, simply cited because it has been constantly under my own observation. From it we may understand how possible it is that a vegetable rooted in the soil may still derive much of its subsistence from a different source; nay, that the root may rather even be necessary to secure it a fixed habitat than for its support.

The mode in which the root acts where its assimilating functions are required, and the laws of its development, are circumstances in general little appreciated by those whose daily pursuits are intimately connected with this part of the vegetable economy. The capability of imbibing from the soil seems to be chiefly confined to the extreme ends of the fibres, and hence arises the drooping of plants when they are shifted from one spot to another. How carefully soever the transplantation may be made, the absorbing extremities are broken off in consequence of their adhesion to the soil; or, otherwise, exposure to the dry atmosphere contracts their tender tissue, and renders it for a time, even when replaced in the moist earth, incapable of drawing the necessary supplies.

A section or slice of one of the fibres above alluded to, viewed under the microscope, shows it to consist of a coating of very lax and distended cellular tissue, including a central column of woody tubes and ducts, the outer portion of the tissue having its cells generally much more compressed than those of the interior, somewhat in the manner represented in one of the figures of cellular tissue portrayed in the last Lecture; but the extreme points of the root-fibres never exhibit such contraction of the external vesicles, which appears to take place gradually, as the result of age and the occasional defalcation of moisture in the soil; to compensate for which change the fibres are continually extending in length during the growth of the plant, and thus perpetually present a newly-formed surface of cellular tissue for the absorption of the stimulating and necessary moisture. These extremities are generally thicker than the part of the fibre immediately above them; and, being of a soft, sponge-like texture on the outside, have received the name of "spongioles." It is by not attending to the preservation of the spongioles, or rather from the total ignorance of many practical gardeners and foresters in regard to their existence, that so many trees and shrubs are killed by being transplanted. The spongiole is the growing point as well as the organ of absorption; and, owing to the little care taken in removing the plant, or rather in consequence of the utter carelessness with which it is wrenched from the imperfectly-loosened soil, by far the greater number of these little, but important, parts are broken off and left in the ground. Hence probably—nay, we might say certainly—the reason why large trees cannot be successfully transplanted. Growing vigorously, such a tree quickly absorbs all the nutritive matter from the soil in its immediate vicinity, and extends its roots from time to time deeper or more widely distant, to seek the required supply elsewhere, until the growing points of their intricate ramifications are too far removed from the site of its trunk to be preserved during the process of shifting. Obvious, however, as are the absorbent functions of the root, as exemplified by these phenomena, no one who has closely studied the varied structure and physiology of vegetables, and marked the diversified habits and modes of growth that often characterize individuals belonging even to the same natural family, will maintain the popular opinion of its being the universal source of aliment. Among those plants whose vital action cannot be supported without it, even but for a short period, there are various grades in the essentiality of its action as an absorbent organ. This is especially evinced by the different situations in which they vegetate, or are capable of vegetating.

It is not intended by any of the foregoing remarks to deny the important agency of the organ under consideration, but only to direct attention to the fact that such agency may be suspended under peculiar circumstances in certain plants; which, still continuing to live and grow, prove that other organs of assimilation exist, and, existing, are more or less concerned in the maintenance of vegetable life. The most essential of these latter are the leaves, of which only a very small number among the higher orders of plants are destitute; and even these tend by their peculiarity of habit to throw a valuable light on their physiological influence.

In regard to the actual functions of the leaves, opinion has been much divided, but they are now very generally considered to be the lungs or breathing organs of the plant; at the same time it is probable that this function is associated with some others, either uniformly acting or dependent on the influence of external circumstances, as the presence or absence of solar light, the condition or changes of the atmosphere, &c.; and, likewise, that in many instances no inconsiderable proportion of substance is conveyed into the growing plant through their medium.

The anatomical structure of a leaf, and the connection which exists between it and the vessels or veins of the wood and inner surface of the bark, are all calculated to maintain the

important function of respiration—a function upon which seem primarily to depend those modifications of the sap that are essential to the production of the secretions that give so great a diversity of character to different vegetables, and render them available to the various purposes of human economy. Considerable analogy, too, unquestionably exists between the breathing apparatus of plants and animals. In the higher orders of the latter the lungs are almost wholly composed of the ramifications of the bronchial tubes or branchings of the windpipe, and two sets of blood-vessels, called the pulmonary veins and arteries—the ultimate divisions of the three being so minute and intricately blended as almost to baffle the researches of the anatomist, even though assisted by the highest powers of the microscope. The delicate extremities of the air-tubes terminate each in a little rounded cell, over the walls of which branch the almost inconceivably minute extremities of the arteries and veins—the blood circulating in which is thus brought into close contact with the air drawn into the lungs at each inspiration.

It would be foreign to our subject to enter into description or discussion of the physiological phenomena connected with this function in the animal, but it is one apparently essential to all organic beings, however it may be modified in their several grades to accord with their greater or lesser complexity of structure, and their diversified habits and modes of existence. Let us now examine the leaves, and endeavor to ascertain how far the received opinions concerning their respiratory functions are capable of being substantiated by fact.

Viewed apart from the plant on which it grows, the leaf is a very curious and complex structure. A frame of fibre branching from the top of its stalk, or, where the stalk is wanting, from the base of the leaf itself, forming a kind of net-work, the interstices of which are fitted up with a green, soft substance, the whole inclosed within a thin skin or membrane, is all perhaps that the unassisted eye is capable of detecting; but the fibrous frame-work, when magnified, is discovered to consist of the woody and spiral tubes already described, compactly bound together at the lower part, and gradually separating from each other in the form of veins as they extend toward the margins and extremity. The green, pulpy matter occupying the intervals between their ramifications consists of cellular tissue, filled with green particles—its little cells not contiguous throughout, but leaving small open spaces here and there; while the skin-like covering of the leaf *(epidermis)* consists of a layer of small compressed cells, apparently empty or only filled with air, colorless and transparent, so as to admit of the colored veins and green tissue of the interior being visible through them. The skin or *epidermis* varies in texture in the leaves of different plants: as does, likewise, frequently that of the upper and under surfaces of the same leaf. The size and arrangement of the cellules of which it is composed are often very irregular. It possesses considerable rigidity and toughness in some plants, and in all serves to protect the more delicate tissue beneath from external injury. In the greater number of vegetables its continuity is interrupted by pores or openings, technically denominated "stomata," which occur in some cases only on the under surface of the leaf, in others on both sides, and are more or less numerous. Thus, in the leaf of the common lilac, which has none on the upper face, 160,000 have been counted on one square inch of the lower; while in that of the carnation, within the same space, there are 38,500 on each side. The stomates are not mere perforations in the epidermis, but spaces, generally of an oval form, in the middle of which is a slit that opens or closes according to the condition of the atmosphere, or other circumstances affecting the state of the growing plant. The oval border consists, in most instances, of two oblong parallel cells, capable of contracting, so as to become somewhat kidney-shaped, thus opening the stomata; which, so long as they remain straight, are closed.

Fig. 3.

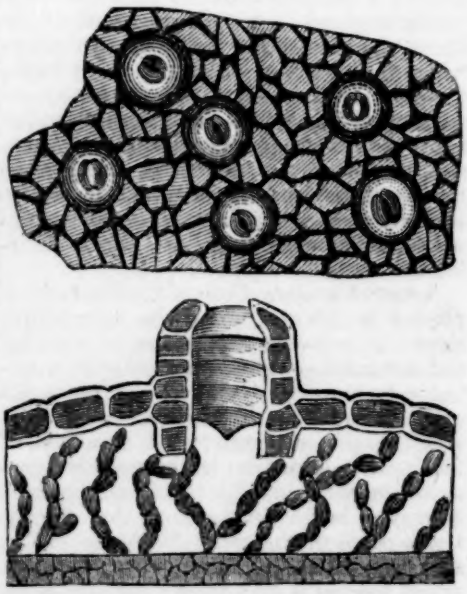
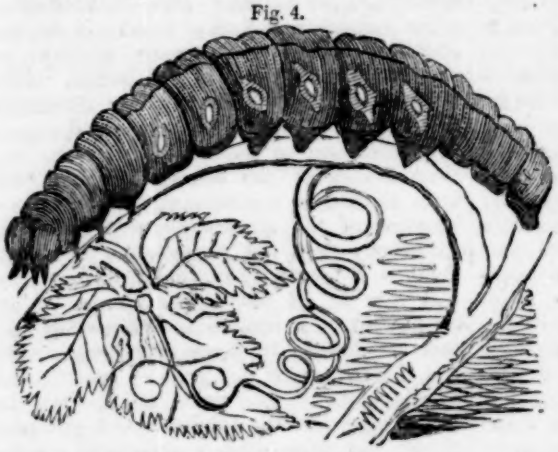


Figure 3 represents a portion of the cuticle of the elk's-horn fern *(acrostichum alcicorne)* highly magnified, with several of its stomata; and at *b* is a vertical section of one of them, showing the vacant spaces into which it opens in the substance of the leaf.

Between these stomates and the spiracles or breathing-pores of some of the lower orders of animals, considerable resemblance unquestionably exists; and numerous experiments (of which our space will not admit any detail) have confirmed the opinions entertained by physiologists concerning their corresponding functions.

It may be difficult for one who has no farther acquaintance with the act of respiration than that derived from his own experience, or from the casual observation of the mode in which it is performed in the few animals of the higher grade with which he is accustomed to associate more or less in the ordinary occupations of his existence, to conceive that such an act can take place otherwise than through the medium of mouth and nostrils; but internal structure is as variable as external form, and involves conditions of life far more diversified than is generally understood. The earth-worm, the spider, the bee and the butterfly are equally dependent upon an alternate inhalation and expiration of the air they move in, as are the man, the quadruped, and the bird; but the process is maintained in a very different manner. The mouth in the former is the vehicle through which food is conveyed into the stomach; but they have no nostrils, and breathing takes place through channels in distant parts of the body. Thus, in the insect, a line of pores is observable on each side of the body, varying in number, but frequently as many as eighteen or twenty, and in certain kinds even many more. They are very evident to the naked eye in many of the larger caterpillars, but in the smaller insects require the assistance of a good magnifying-glass or microscope to discover them. Their position is shown on one of the common cabbage-caterpillars in figure 4. A feather,

Fig. 4.



or a camel's-hair pencil, dipped in oil, and drawn over these two lines of spiracles or pores, kills the insect by suffocation; and if a leaf be rubbed over with oil or varnish, so as to close its stomates, it dies. Hence, indeed, one principal cause why certain plants will not flourish under the shade of trees, while others are not affected by it. In almost all of the latter class that I have examined, the stomates are either wholly wanting on the upper surface of the leaf, or they are comparatively very few in number. Where the stomates are numerous on the upper side, they may become choked by the heavy dripping from the leaves of the tree in wet weather; and, evaporation being checked by its shade, a similar effect is liable to be produced to that arising from the coat of oil or varnish; and I am inclined to believe that this operates as injuriously, or even more so than the obstruction of light, and other causes to which the evil is more generally attributed.

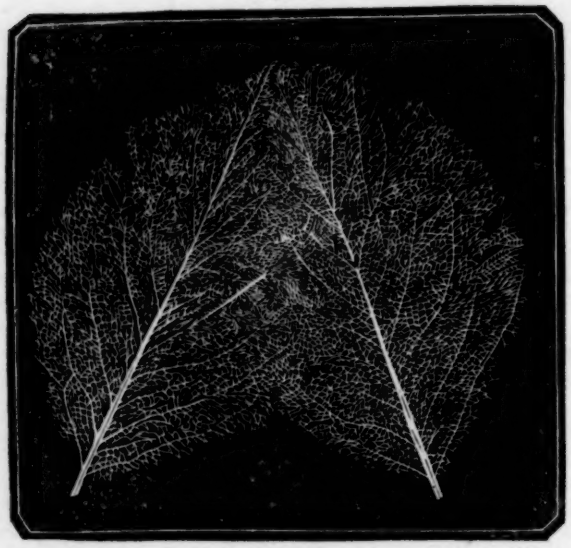
To enable you to appreciate to the desired extent the analogy existing between the respiration of vegetables and animals, a farther examination of the structure of the leaf will be necessary. By maceration, or soaking in water for a few weeks, the decomposition of the softer, cellular portion of the leaf is effected, the skin readily separates, and the pulpy portion occupying the interstices of the veins may be removed by careful washing, leaving the latter entire—they being, in consequence of the greater strength and rigidity of their texture, less liable to decay than the other parts. In this manner the beautiful preparations commonly called the *skeletons* of leaves are obtained; and if the maceration be continued a little longer, the net-work of veins (at first sight apparently simple or consisting of a single series only) divides into two, precisely corresponding with each other, as shown in figure 5. [See next page.]

This curious structure is perhaps more readily ascertainable in the leaf of the common holly than in any other well-known plant, the two sets of veins being less firmly attached than in leaves of thinner substance; but examples of their partial separation may be met with in most damp woods in the spring, among the strata of dead and decaying leaves that then cover the ground. Now, by cutting the stalk of any leaf transversely, and examining the section with a magnifying-glass, you may discern the origin of these veins in two or more masses of fibre; and by carefully cutting through the leaf-stalk, and the stem or branch on which it grows, lengthwise, you may, with the assistance of your glass, trace the connection of one portion of the fibre—namely, that which branches out into the upper net-work of veins—with the woody sheath that encompasses the pith: the other portion, the origin of the lower net-work, passes downward into the "liber," or inner substance of the bark.

This disposition is precisely accordant with the supposed functions of the leaf as an organ of respiration. The sap rises through the woody tubes that surround the pith, forming what is technically called the medullary sheath; and these tubes, branching out into the delicate veins of the upper surface of the leaf, expose it to the action of the air admitted through the medium of the stomates into the internal cavities before described. Whatever may be the nature of this action, which is probably chemical, the properties of the sap are altogether changed by it. From a fluid of comparatively simple character it becomes the depository, in different vegetables, of various proximate principles, of the most com-

plex combinations and energetic qualities; all, indeed, that is hurtful as poison, useful as medicine, valuable in the arts, applicable as food, or otherwise capable of being rendered subservient to human economy, is more or

Fig. 5.



less dependent upon this elaboration of the sap. There are differences of opinion, as previously stated, as to the mode of vital action and the ultimate organization by which these results are effected. Even the theory of vegetable respiration, once considered to be established beyond the possibility of doubt, and supported by numberless experiments apparently the most conclusive, is no longer a settled point in physiology. Some very nice distinctions have been made between the process in question and that of digestion, to which the leaves are likewise subservient; but neither of these operations are sufficiently obvious in the experiments hitherto performed on growing plants to enable us to separate them. By whatever name we designate the source of these modifications of the vegetable juices, and whether we regard it as a simple or a binary process, it is accompanied by a large amount of exhalation. A common sunflower, three feet high, is found to exhale one pound and a quarter of fluid, chiefly water, every day; and the common cabbage nearly as much. This exhalation is ascertained to be chiefly through the medium of the leaves; and, considering their corresponding functions, is analogous to the watery exhalation that accompanies the action of the lungs in animals. That the stomata are concerned in the disposal of this superfluous moisture seems to be very evident, as in succulent plants, and others growing in situations subject to long-continued drouth, these openings are generally very sparingly distributed, while they are most numerous in those that derive large supplies of water from the soil in which they naturally vegetate. Led away by this fact, and contemplating the vast quantity of water exhaled by plants possessing numerous stomata, some physiologists of the present day seem inclined to deny the instrumentality of the latter in the admission of air to the interior substance of the leaf; regarding them only as organs of excretion, like the pores of the animal skin.

The reciprocal action of the spiral vessels is no less a subject of dispute than that of the stomata, and on a similar one-sided view of their structure and situation; although no authenticated instances can be adduced of their containing, at any period after their first development in the tissue of the plant, anything but air; and they are for the most part only traceable in those portions upon which these curiously adapted openings exist—so uncertain is our actual knowledge of the phenomena of vegetable growth, and of the vital functions which they indicate! In fact, there is scarcely any branch of physical science so little understood as that of Vegetable Physiology.

By examining the interior of the human body after death, and comparing the relative situations of its various organs with the functions and sensations of the living, we are enabled to decide with a tolerable degree of certainty upon their real agency in the system; and, on dissecting other animals and finding organs in similar situations and bearing similar relations to each other with those of the human body, we are justified in drawing our inferences accordingly. And in this manner, descending from one to another through the various grades of the animal kingdom, we have arrived at a comparatively correct estimation of the grosser elements of their existence; but the organization of vegetables is so perfectly distinct from our own and that of all the higher classes of animals, that it is impossible to draw any correct conclusions by mere comparison. We can, indeed, trace the gradual growth and development of their parts, and observe the loss of vigor and the debility which precedes decay, and from other concomitant circumstances consider them as exceptions to the inertia of matter; in other words, as being endowed with that hitherto incomprehensible principle, *life*. We can proceed a few steps farther by dissection, and, discovering a system of vessels traversing the plant throughout its whole substance, are led to conclude that life here, as in animals, is dependent upon a continually repeated elaboration and modification of the fluids they contain; nay, the microscope shows us those fluids in motion, and almost in the act of depositing the petty molecules that contribute to the growth of the tissue. There we stop. Comparison fails to assist our researches any farther; and experiment, often founded on the uncertain basis of bare conjecture, is our only guide beyond.

A SUBSCRIBER LOST.

A source of very particular satisfaction to every true spirited conductor of a periodical, must be the belief that its patrons take it for the sake of *reading it* —and yet more, that the more they read it the more interested they become in the pursuit it is intended to illustrate and improve. Deeply should we regret to think that The Farmers' Library was valued only for the *money* it may enable a subscriber to make, by a practical application of some useful recipe, or of some new machine or manure. We have been fondly persuading ourselves that those who take it entertain more enlarged views of their profession, and feel the obligation to become acquainted, not only with the properties and culture of the staples of their own farm, but, that as cultivated men, proud of their calling, they would like to be informed in all the branches of it—both in its practice and its literature: that every gentleman farmer would like, for instance, to have a general acquaintance, at least, with the productions of all the States of his own country, and the nature of the fertilizers and other means employed in their cultivation. How, for example, would any father like to have his son, if asked in Europe what the agricultural staples of South Carolina, or of Maine, or Vermont, answer "I do n't know! My business has been raising cattle, and I have never known or inquired whether rice will flourish on uplands, or sheep get the rot on low lands!" Would it follow, because a gentleman cultivates land of virgin and inexhaustible fertility, that therefore he should be content to be ignorant of the action, composition, and effects of *poudrette or of bone manure?* We confess to not much pleasure in laboring for the amusement or benefit of men of such contracted views. True, every honest man must work for his bread, but we take pride in working, with more heart, for higher objects; and while it is highly gratifying to know that with a steadily increasing list of subscribers, *very few* have withdrawn; yet we can hardly hope to retain those who may be so easily lost as the writer of what follows—most respectfully be it said:

"I have read the numbers with some care, and am satisfied that they do not, for many reasons suit the farming interest of South Alabama; we have too much good *wood land* here which can be purchased for $1 25 per acre, to care much about what virtue there is in *bone manure*," &c.

According to the above, we might infer that they only wish to be informed about the best mode of clearing and grubbing new land!

ANNUAL STATEMENT OF THE COTTON TRADE.

CROP.	1846.	1847.
New-Orleans	1,037,144	705,979
Mobile	421,966	323,462
Florida	141,184	127,852
Texas	27,008	8,317
Georgia	194,911	242,789
South Carolina	251,405	350,200
North Carolina	10,637	6,061
Virginia	13,282	13,991
Received overland	3,000	
Total	2,100,537	1,778,651
	1,778,651	
Decrease this year	321,886	

EXPORTS.	1846.	1847.
To Great Britain	1,102,369	830,909
.. France	359,703	241,486
.. North of Europe	86,692	75,689
.. Other foreign ports	118,028	93,138
Total	1,666,792	1,241,222

Showing a decrease of 271,460 bales to Great Britain, 118,217 to France, 11,003 to North

of Europe, and 24,890 to other foreign ports, making the total decrease in the exports for the year ending September 1, 425,570 bales.

The quantity taken for home use during the year amounted to 427,967 bales, being 4,900 bales more than last year.

The quantity of new cotton received at the shipping ports up to the 1st of September amounted to 1,121 bales, against about 200 bales last year.

GROWTH.

Total Crop of	Bales.	*Total Crop of*	Bales.	*Total Crop of*	Bales.	*Total Crop of*	Bales.
1827–8	712,000	1832–3	1,070,438	1837–8	1,801,497	1842–3	2,378,875
1828–9	857,744	1833–4	1,205,394	1838–9	1,360,532	1843–4	2,030,409
1829–30	976,845	1834–5	1,254,358	1839–40	2,177,835	1844–5	2,394,503
1830–1	1,038,848	1835–6	1,360,725	1840–1	1,634,945	1845–6	2,100,537
1831–2	987,477	1836–7	1,422,930	1841–2	1,683,574	1846–7	1,778,651

BARREL MAKING.—The Oswego Times estimates that $260,000 will be paid out this year by the Oswego millers for barrels, the number being from 600,000 to 800,000. The barrels are principally made by machinery. and the Times says in the shop of Mr. Wentworth, his staves are cut and dressed by machinery, propelled by a steam-engine. The staves are cut from the block at the rate of 8000 a day. The steaming process is done by the steam from the engine. After the staves are cut, they are sawed by two buss saws, all of one length, and then dressed and jointed in a very expeditious manner on a large wheel, into which knives are inserted. The stave is then fit for use. Six men will cut and dress 8000 in a day. In another shop the barrels are put together. The establishment turns out from 1000 to 1500 barrels weekly, and gives employment to about 35 workmen.

☞ Mr. RANDALL's Letters on "*Sheep Husbandry in the South*" will be continued in our next issue.

PRICES CURRENT.

[*Corrected, October 23, for the Monthly Journal of Agriculture.*]

ASHES—Pots, 1st sort, '47	℔ 100 lb.	6 50	@— —
Pearls, 1st sort, '47		8 —	@— —
BEESWAX—American Yellow		— 24	@— 25
CANDLES—Mould, Tallow	℔ lb.	— 12½	@— 14
Sperm		— 31	@— 33
COTTON—From	℔ lb.	— 8½	@— 10¼
COTTON BAGGING—Kentucky		— 15½	@— 16
CORDAGE—American	℔ lb.	— 11	@— 12
DOMESTIC GOODS—Shirtings,	℔ y.	— 5	@— 11
Sheetings		— 6½	@— 15
FEATHERS—American, live		— 28	@— 33
FLAX—American		— 8	@— 8½
FLOUR & MEAL—Genesee, new, bbl.		6 62½	@— —
Oswego, new		6 50	@ 6 56¼
Michigan, new		6 50	@ 6 56¼
Ohio, new		6 50	@ 6 56¼
Ohio, Round Hoop		— —	@— —
Ohio, via New-Orleans		— —	@— —
Pennsylvania		— —	@— —
Brandywine		6 75	@— —
Georgetown		6 62½	@ 6 75
Baltimore City Mills		6 62½	@ 6 75
Richmond City Mills		— —	@— —
Richmond Country		6 62½	@ 6 75
Alexandria, Petersburg, &c		6 62½	@ 6 75
Rye Flour		5 —	@— —
Corn Meal, Western and State		3 —	@ 3 25
Corn Meal, Jersey and Brandywine		3 50	@ 3 75
GRAIN—Wheat, White	℔ bush.	1 40	@ 1 47½
Wheat, Red and mixed		1 10	@ 1 37½
Rye, Northern		— 90	@— 92
Corn, Jersey and Northern yel		— 75	@— —
Corn, Southern, yellow		— 75	@— —
Corn, Western, yellow		— 75	@— —
Oats, Northern		— 48	@— —
Oats, Southern, new		— —	@— —
HAY—North River in bales,	℔100lb	— 58	@— 60
HEMP—American, dew-rotted	ton	140	—@150 —
" " water-rotted		200	—@250 —
HOPS—1847		— 8	@— 10¼
IRON—American Pig, No. 1		35 —	@37 50
" Common		27 50	@30 —
LIME—Thomaston	℔ bbl.	— 75	@— —
LUMBER—Boards, N.R.,	℔M. ft. clr.	35 —	@ 40—
Boards, Eastern Pine		— —	@— —
Boards, Albany Pine	℔pce.	— 12	@— 21
Plank, Georgia Y. Pine.	℔ M. ft.	27 50	@— —
Staves, White Oak, pipe,	℔ M.	50 —	@— —
Staves, White Oak, hhd		40 —	@— —
Staves, White Oak, bbl		30 —	@— —
Staves, Red Oak, hhd		24 —	@28 —
Hoops		20 —	@30 —
Scantling, Eastern		16 25	@22 50
Scantling, Oak		30 —	@35 —
Timber, Oak	℔ cubic foot	— 25	@— 30
Timber, White Pine		— 18	@— 25
Timber, Georgia Yellow Pine		— 28	@— 32
Shingles	℔ bunch	1 75	@ 2 25
Shingles, Cedar, 3 feet, 1st quality.		26 —	@30 —
Shingles, Cedar, 3 feet, 2d quality.		24 —	@28 —
Shingles, Cedar, 2 feet, 1st quality.		18 —	@22 —
Shingles, Cedar, 2 feet, 2d quality.		16 —	@20 —
Shingles, Cypress, 2 feet		15 —	@18 —
Shingles, Company		35 —	@38 —
MUSTARD—American		— —	@— —
NAILS—Wrought, 6d to 20d	℔ lb.	— 10	@— 14
Cut, 4d to 40d		— 4½	@— 4½
PLASTER PARIS—	℔ ton	2 37½	@ 2 50
PROVISIONS—Beef, Mess,	℔ bbl.	10 —	@11 —
Beef, Prime		7 —	@ 7 50
Pork, Mess, Ohio		15 —	@— —
Pork, Prime, Ohio		10 50	@10 75
Lard. Ohio	℔ lb.	— 10	@— 11¼
Hams, Pickled		— 7	@— 8½
Shoulders, Pickled		— 6½	@— 6¾
Sides, Pickled		— —	@— —
Beef, Smoked	℔ lb.	— 10½	@— —
Butter, Orange County Dairy		— 19	@— 20
Butter, Western Dairy		— 16	@— 18
Butter, Grease		— —	@— —
Cheese		— 6½	@— 7½
SEEDS—Clover	℔ lb.	— 7	@— 7¾
Timothy	℔ tierce	14 —	@16 —
Flax, Rough		— —	@— —
SOAP—New-York	℔ lb.	— 4	@— 7
TALLOW—American Rendered		— —	@— 10
TOBACCO—Virginia	@ lb.	— 2¼	@— 6¼
North Carolina		— —	@— —
Kentucky and Missouri		— 4	@— 7¼
WOOL—Am. Saxony, Fleece,	℔ lb.	— 45	@— 50
American Full Blood Merino		— 38	@— 40
American ½ and ¾ Merino		— 33	@— 36
American Native and ¼ Merino		— 28	@— 30
Superfine, Pulled Country		— 33	@— 35